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Science & Technology

***USSR: Science &
Technology Policy***

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CONTENTS

14 NOVEMBER 1988

Organization, Planning, Coordination

S&T Research Institute Director on Consequences of Reforms [V. V. Solomatina Interview; SOVETSKAYA ROSSIYA, 24 Aug 88]	1
Chairman of Academy's New Ural Department on Progress, Prospects [G. A. Mesyats Interview; PRAVDA, 18 Aug 88]	5
New State Interbranch Association 'Kvant' Formed [A. Prilutskiy; VECHERNAYA MOSKVA, 8 Aug 88]	8
Cost-Benefit Analysis Lacking for Major S&T Projects [G. Sidorova; NTR: PROBLEMY I RESHENIYA, 19 Jul-1 Aug 88]	11

Budget, Finance

GKNT Chairman Tolstykh Discusses Transition to Self-Financing [B. V. Tolstykh; NTR: PROBLEMY I RESHENIYA, 5-18 Jul 88]	16
Ramifications of Introduction of Cost Accounting into Science [B. L. Tolstykh Interview; ARGUMENTY I FAKTY, 27 Feb-4 Mar 88]	17
Scientific Research Institute Details Experience With Self-Financing [G. Ivanenko; NTR: PROBLEMY I RESHENIYA, 21 Jun-4 Jul 88]	20
Cost Accounting Mechanism for Science [R. Kozhevnikov; PLANOVOYE KHOZYAYSTVO, No 7, Jul 88]	22

Facilities, Manpower

Talented, Young Scientists Co-opted into Administrative Career Tracks [B. Raushenbakh Interview; ARGUMENTY I FAKTY, 23-29 Jul 88]	29
Turnover of Officials in Academy of Sciences Reported [A. Lepikhov; NTR: PROBLEMY I RESHENIYA, 7-20 Jun 88]	31
Funding Problems Prominent at Session of Leningrad Scientific Center Presidium [N. Volynskiy; PRAVDA, 27 Jun 88]	31

Training, Education

Institute Head on Laboratory Closings, Inadequate Science Training [U. K. Alekperov Interview; BAKINSKIY RABOCHIY, 6 May 88]	34
Professor Decries Technological Lag of Soviet Students, Lack of Computer Experience [V. Akhmedov; BAKINSKIY RABOCHIY, 11 May 88]	36

Automation, Information Policy

U.S. Approach to S&T Security Issues Outlined [K. Petrov; NTR: PROBLEMY I RESHENIYA, 6-19 Sep 88]	38
Reforms Fail to Improve Publication of S&T Literature [M. Gelman; NTR: PROBLEMY I RESHENIYA, 7-20 Jun 88]	38
Scientist Sees Little Improvement Despite Lifting of S&T Publication Rules [V. Krichagin; NTR: PROBLEMY I RESHENIYA, 6-19 Sep 88]	42
Effects of Proposed Changes in Secrecy, Military Policies on Civil Production [G. Pushkarev; NTR: PROBLEMY I RESHENIYA, 6-19 Sep 88]	43
USSR Supreme Soviet Attacks Lagging Computer Industry [A. Ivakhnov; IZVESTIYA, 15 Aug 88]	45

Conferences, Expositions

Reports From Annual Session of Latvian Academy of Sciences for 1987	48
Report on Presidium's Work	
[V. P. Samson; <i>IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR</i> , No 6, Jun 88]	48
Report of Technical, Physical Sciences Department	
[A. F. Krogeris; <i>IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR</i> , No 6, Jun 88]	54
Report of Chemical, Biological Sciences Department	
[R. A. Kukayn; <i>IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR</i> , No 6, Jun 88]	56
Speech of CPL CC Secretary	
[Ya. Ya. Okherin; <i>IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR</i> , No 6, Jun 88]	59
Discussion of Presidium's Activity	
[<i>IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR</i> , No 6, Jun 88]	63

General

Baklanov Visits Troubled MNTK 'Rotor' [<i>IZVESTIYA</i> , 7 Aug 88]	68
Academician Calls for More Emphasis on Human Problems Research	
[V. Kaznacheyev; <i>NTR: PROBLEMY I RESHENIYA</i> , 21 Jun-4 Jul 88]	68
Decentralization, More Freedom for Scientists Urged	
[L. Zagalskiy, V. Sharov; <i>LITERATURNAYA GAZETA</i> , 22 Jun 88]	69

Biographic Information

Biographical Sketch of Latvian Academician R. Ya. Karklin	
[<i>IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR</i> , No 2, Feb 88]	76
Obituary of Ukrainian Geologist Oleg Stepanovich Vyalov [<i>RADYANSKA UKRAYINA</i> , 4 Jun 88]	77

**S&T Research Institute Director
on Consequences of Reforms**
*18140006 Moscow SOVETSKAYA ROSSIYA
in Russian 24 Aug 88 p 3*

[Interview with Professor V.V. Solomatin, director of the All-Union Scientific Research Institute of the Automation of Management in the Nonindustrial Sphere (VNIINS), by Aleksandr Nemov and Georgiy Georgiyev under the rubric "The Practice of Restructuring": "The Poles of Reform"; date, place, and occasion not given; first two paragraphs are SOVETSKAYA ROSSIYA introduction]

[Text] Nearly one in five of the world's scientists works at a Soviet sectorial institute; nonetheless, the return from this enormous intellectual army is small. How is such a situation to be changed? Professor V.V. Solomatin, director of the All-Union Scientific Research Institute of the Automation of Management in the Nonindustrial Sphere (VNIINS), reflected on this in December of last year on the pages of SOVETSKAYA ROSSIYA. The discussion on the new forms of the organization of scientific activity was continued by the letter of Leningrad chemist T. Bogacheva (SOVETSKAYA ROSSIYA, 19 May 1988). Discussion of this publication took place at the All-Union Scientific Research Institute of the Hydrolysis of Plant Material in Leningrad (SOVETSKAYA ROSSIYA, 5 August 1988).

Today the director of the All-Union Scientific Research Institute of the Automation of Management in the Nonindustrial Sphere (an engineering center, a joint enterprise with the Italian firm Olivetti, and a scientific cooperative have been established at the institute) continues the theme of the reform of sectorial science. As of 1 January 1988, many scientific research institutes changed over to cost accounting. Has their work changed fundamentally in so doing? Our present interview with V.V. Solomatin also began with this question.

First, How My Own Views Have Changed

[Answer] Unfortunately, if we speak about specific results, there are no appreciable changes for the better. And this was spoken about with alarm at the 19th All-Union Party Conference. I will say later why, in my opinion, this happened. First, how my own views have changed in past months.

First, the understanding of sectorial science has undergone radical change. Under the conditions of cost accounting any enterprise has the opportunity to enlist for the accomplishment of a task facing it any scientific collective, and not necessarily from its own sector. Although the principle of a planned nature in science, in my opinion, is fundamental, the end result—the introduction of a new technology, the increase of the profit—has a greater effect than the fulfillment of "the plan on science" on the status of both the enterprise and the institute. This dictates entirely new conditions of the life

of the scientific collective. It should be dynamic and should reorganize itself immediately for new tasks. The ossified structures of scientific research institutes made up of stable divisions and laboratories have begun to collapse under the influence of cost accounting. Temporary creative collectives and brigades are appearing more and more often. Given different names, their essence is common—they are established for a specific problem. And what is the main thing, they view their activity without fail through the prism of economics.

The second thing that had to be revised is my own understanding of cost accounting. Any textbook interprets it as a method of comparing the expenditures and the results. Such an accounting interpretation is very superficial.

If we get to the bottom of its essence, this is the way of life of the organization, the way of life of the collective. New principles of management and the development of democracy are included here. Moreover, it must be understood that democracy in economics is not political democracy. Here the distinction should be clear, but today it is not being maintained. This is even evident also from elections at enterprises.

How Life at Our Institute Has Changed

How has life at our scientific research institute changed? The new conditions of management required the interests of the institute and the individual researcher to be linked. So that each scientist is to be changed over to cost account? We decided that the division, which provides products suitable for sale, should be on cost accounting. The question was put as follows—the institute formulates the scientific and technical policy, specifies the basic directions of work, provides resources and equipment, while the division itself thinks about how to earn money. But having said "a," it was also necessary to say "b." Since the institute no longer guarantees the receipt of assets, the right of choice of the manager should be turned over to the collective. What product should be produced—a world-class one or one that is not in demand, which, of course, influences the backlog of orders and the wage of associates, depends precisely on the manager. Therefore, the collectives of the divisions had to choose their leaders themselves.

In several divisions a candidate, to whom the absolute majority of associates would entrust their fate, was not found. They consulted with me and debated, that is, the people in reality chose managers, with whom it would be possible to work efficiently. This is an element of democracy precisely in the economic sense. It began to operate here at the same time as cost accounting. And although the collective supported such an approach, it is impossible to say that the doing away with administrative management took place painlessly.

Now administrative methods are being criticized mainly for two reasons. The first thing is for their total dissemination, the second reason is that they are linked mainly with adverse influences, with punishments. After some time in our country a certain portion of society will recall them with nostalgia. Why? Because for a long time we paid for work as a process and not a result. If you sat at your place 8 hours during the month, you receive money at the cashier's office. Or if you produced 100 machine tools, as was recorded in the plan, you will live peacefully. But what if no one needs these machine tools of obsolete design? What if there is no demand for them? In case of administrative methods it is possible to explain, take into account, and level everything. The state assumes the losses from the incompetence of others. In case of economic methods of management such a thing is impossible.

What does this mean in practice? The plant collective of 1,000 produced machine tools that lie as dead weight in the warehouse, hence, the till is empty. The workers and engineers will demand from the ministry and the Council of Ministers monetary compensation for their labor. But under the new conditions departments will not come to the rescue. It is necessary to make clear to everyone that when we are fighting against administrative methods, we are fighting not only against punishment, but at the same time for the elimination of the levers of nonreturnable assistance. Perhaps, it sounds unpleasant, but under the conditions of cost accounting only those who will be able to work efficiently, will live well. Whoever has enough initiative, competence, and talent.

Is it perhaps all the same worthwhile for society to be a little "more kind"? But here is what such kindness costs. Today about 300 billion rubles lie in savings banks. These assets are not backed by the necessary products. Hence, someone has worked, has earned a wage, and has not produced the goods needed by society. These billions are for our economy like a lead belt for a swimmer. You use your legs and arms a lot, but it pulls you not forward, but to the bottom.

Now there are instances when they withhold wages — there is nothing with which to pay. Money is not involved in the turnover. There is a shortage of the very simplest goods in the stores. Inflation has driven us into a corner. So that one will have to drink to the bottom the bitter cup of treatment by cost accounting. What did I say that for? Now it will be clear.

At the institute they sensed very soon that the way of life of the collective was changing. Scientific associates began to determine themselves the additional, variable portion of the wage, the increments, the bonuses, and so on. The moral climate in the collective changed immediately. Previously everything came from me, the director. I was satisfied with some kind of worker and not satisfied with some kind of worker. Now the scientific collective decided themselves who is more useful for the common cause. Everyone began to understand what he

should do in order to earn money. And each one began to evaluate another, that is, self-monitoring appeared. I also ascribe this to economic democracy. The concept "a good person" in the sense of one who indulges my good and bad initiatives is beginning to be washed away from official usage.

It is worth looking more closely at the processes taking place. First, labor productivity has risen, the workload of people and the subdivisions has increased. They are increasing it themselves. But whereas previously the division set to work any order, which the board of directors sent down from above, now it is impossible to force it to do so administratively. It is possible to interest it economically. This required the functions of the headquarters of the scientific research institute to be changed. It was necessary to engage in the preliminary evaluation of orders.

In general one should note the substantial change of the functions of management. To what did they mainly reduce previously? Regardless of the will of the subdivision to charge it with a little larger plan, and then to require its fulfillment. Economic methods solved this problem—they take the plan themselves and fulfill it themselves, interest emerged. Now they expect from the board of directors of the institute the realistic specification of scientific and technical directions and suggestions on the most efficient organization of labor, the extension of cost accounting relations, and assistance in personnel policy. Our activity has begun to be of a more creative nature.

Moreover, differentiation in wages is occurring. The skilled portion of associates has been separated—they feel very well, the "mediocrities" feel normal, and the unskilled portion is disappearing completely from the system of institute life. People are simply running about in search of employment. Take if only the engineering center which was established at our institute. About 100 people work there. And here is the opinion of the managers of the center: we will fulfill all the planned orders, but we have not less than 45 extra people (more blunt estimates also exist). In general it is understandable. Labor productivity has risen, quality has increased, the wage has been raised, that is, we have obtained the result that we wanted. And it turned out that today there is a shortage not of manpower—this is an invention. There is a shortage of work.

Here I have said that cost accounting turned everything right side up. That is correct. But the new conditions of management are an enormous set of questions: economic, social, legal, and so on. Have all of them been settled? The whole point is that they have not. Therefore, we are in a state of unstable equilibrium. The managers of the engineering center have released a third of the associates. Can I, the director of the institute, settle this question? Can I dismiss them? No. Why dismiss these people? They worked here, some 10 years, some 15

years. They did not do anything bad. Moreover, they are asking for work, but it is not being given to them. Why? Because there are people who do it more quickly and with better quality.

Is Socialist Competition Possible

The Law on the State Enterprise, which also concerns scientific organizations, has been adopted. We, apparently, are one of the few institutes which have attempted to fully implement all its directives. All of them. Therefore, we can serve as a kind of model. From our example it is evident that the national economy of the country will get significantly less from the observance of this law than is anticipated.

Not only at the engineering center, but also throughout the institute it is possible to release a fourth of the scientific associates for other work. Is it a large gain for the national economy? An enormous one! Our products sell well on the western market. But we sell turnkey to leading firms automated systems that have been developed by Soviet mathematicians, programmers, and economists. We want to get in a year orders for \$1 million in excess of the plan. And we do not need anything in addition. Work and work. Such is the result of the introduction of cost accounting. But, having gotten high labor productivity and having gotten quality, we have not given the state anything in the sense of the release of manpower. These are concealed manpower resources. Cost accounting has made this concealed resource exposed. The task, so it seems to me, is to create in a legislative manner a mechanism of the efficient use of manpower resources.

And about another contradiction, more precisely, ill-considered thing in the new economic mechanism. Now many enterprises have rejoiced: it is possible to sell a produced commodity by means of an economic contractual price. It is believed that this price should be controlled by the market, and not by administrative methods. All economists agree with this thesis. But a mistake of the transitional period (of the transition of all organizations to full cost accounting) is also incorporated in it. Inasmuch as it turned out that in our country monopolists produce the bulk of the output, the cost accounting price is the direct picking of the pocket of the consumer. In the area of computer technology let us take personal computers. Now they cost approximately 20,000 rubles. Abroad ones similar in class cost about \$1,000-2,000. It is possible to observe everywhere that any negligible changes in items due to the monopoly and shortage lead to an increase of the price. Under the conditions of monopolistic production the first mistake is the rejection of price regulation. The market regulates prices, if per 100 consumers there are 40 suppliers. In the competitive struggle the optimum price will be determined. But if the consumer has no where to go.

But is competition in our country possible? Certainly! It has long existed in the area of the development of program products for computer hardware. For example, analogs of our institute exist in all sectors. Therefore, it is possible to intrude into their spheres only with a higher quality product and, incidentally, with lower prices. And we agree to this. Competition is the most important condition of progress.

How is competition to be intensified in science? I believe that here it is possible to go in several directions. For example, to encourage in every way the establishment of scientific cooperatives. The opportunity to enlist only talented scientists and to settle flexibly all current questions will enable them to compete very successfully with entire institutes. It is not necessary to go far for examples. The city soviet executive committee decided to increase the efficiency of its work, in particular, to pursue a better thought out personnel policy. It was necessary to create a data bank, in which information on thousands of enterprising people of the city would be included. The scientific research institute was willing to develop such an automated system in 3 years and for 500,000 rubles. A cooperative accomplished this task in 3 months and for 50,000 rubles. The institute lost a prestigious order, for it this was a "warning bell." It is possible to imagine what will happen if this trend becomes predominant.

The Law on the Enterprise Should Be a Law of Direct Effect

Why can cooperatives operate more efficiently than scientific research institutes? They have greater independence. It does not exist at sectorial institutes. Even the Law on the State Enterprise does not help. But this law first of all was also adopted to broaden the independence of collectives, including scientific collectives. Why is it turning out this way?

At the 19th All-Union Party Conference many delegates touched upon this problem. I will state my own point of view.

The law is now reminiscent of a summary of wishes: "how good it would be to do." Let us take even its title: the Law on the State Enterprise. The personnel of ministries quietly got their bearings and say: this does not apply to us. There nothing is recorded that it is mandatory for observance in the ministry. This law is only for enterprises. Why did such a loophole appear for members of the state machinery? Because the main thing was omitted—so that the law would be observed, it is necessary to record who observes it and when and how he answers for this.

The "diffuse nature" of the law is having the result that it cannot be a law of direct effect. What does this mean? In order to live according to it, departmental instructions

are necessary. But further it is no longer worth talking about the rights of the enterprise. The laws on the department are written by the department to which they are addressed.

Even if we assume that the law would be ideal, the adoption of the law in itself is only the basis for new economic practice, while practice itself is just forming. A great struggle for its formation and the overcoming of many formed contradictions lies ahead.

The question: what is state or national property, remained unresolved. All the laws of any country of the world are strung on this question: Who is the owner of the means of production? Let us take the capitalist. In principle it is impossible to dictate to him how much capital to release for development and how much for wages, what to demolish and what to build, what to sell and to whom. By virtue of the fact that he is the proprietor. This enables him to regard as of paramount importance the efficient operation of production. Only in this case will he live well.

But what about in our country? The machinery, which by its nature should merely serve, has begun to perform the role of the owner. It should serve, but not manage. It is perfectly visible in economics, in politics, in ecology...to what the opposite leads. Production became unprofitable, billions of rubles of assets were invested in obviously absurd projects, while officials at enterprises, scientific research institutes, and departments lived as if nothing had happened.

So who should become the owner today? Who should be authorized to dispose of means of production on behalf of the state? The labor collective. It is necessary to turn over precisely to it everything at the enterprise (the scientific research institute, the design bureau, and so on) with the rights of ownership or to lease everything to it. We truly need to cultivate the sense of being the socialist owner. The understanding that cost accounting is a way of life leads precisely to this.

And the New Approaches in the Intensification of Cost Accounting at the Scientific Research Institute

Now let us discuss the qualitative parameters of products. Our institute produces more than half of the products at the world level, leading western firms are purchasing them. And we understand that today there is only one way not to lag behind others—to keep in pace with everyone (that is, to work at the world level) or even to go faster.

Usually the task is formulated as follows: to achieve the world level in the quality of the most important products—motor vehicles, machine tools, computer hardware. More precisely: it is necessary to attain and consolidate one's hold on this level, which is also advancing, and to do this forever. We are not losing to other countries either in the talent of the people or in material

resources. If we are losing in something, first of all it is in the acuteness of economic stimuli. This does not mean simply the increase of the wage. Comprehensive steps of positive and negative economic influence on the individual and the collective are needed. In our opinion, the improvement of the relations of collectives with the state in the person of its authorized representative—the ministry—should be continued. I am not an advocate of the indiscriminate criticism of ministries, it is not conducive to anything constructive. It is necessary to comprehend the new roles and relations. The ministry can ensure the consumer protection against a monopolistic producer, can monitor whether the price for a product reflects the social need, can establish production priorities, and can propose economic models of development. The domestic and foreign market and the trends of scientific and technical progress in areas of interest can be studied and intermediary activity can be carried out on a cost accounting basis directly for the enterprise. Perhaps, it seems strange to accept it, but, apparently, the ministry has actually lost responsibility for the plan of the enterprise. And conclusions should be drawn from this fact.

Now we jointly with the Ministry of Instrument Making, Automation Equipment, and Control Systems are forming new contractual relations. Specialists of the State Planning Committee and the USSR State Committee for Science and Technology are helping us in this work. We have come to the conclusion that the following versions are possible:

—a direct contract that reassigns a portion of the functions of the ministry to the institute;

—a leasing contract with the ministry, perhaps, with the repurchase of the fixed production capital or without it. In any case the labor collective should be given the right to manage on its own behalf the fixed and working capital, cost accounting income, and accumulations. The terms of use of the material and financial resources of the institutes are fully specified by the council of the labor collective.

The regulatory functions of the ministry as a state organ are retained in the area of the issuing of state orders for the delivery of products (services) and the determination of the tax rate on income and currency receipts.

The problem of the acuteness of economic stimuli can be solved, for example, by the sharing of each worker in the income of the institute. Personal accounts of associates, to which there is transferred the share of the income, which corresponds to the size of their personal contribution to the end results of the activity of the collective, can be introduced. This size is determined directly in the collective—the laboratory, the brigade, that is, where every minute of working time is in sight, where not only the share of the created product, but also an idea, which yielded an impact, can be evaluated. The salaries adopted everywhere are the basis for the system of the remuneration of labor, everyone receives a wage, but a

calculation is made periodically of what each person has in his personal account after the deduction of wages. Who has a plus, who has zero, who has a minus. And if a performer from quarter to quarter has a minus, this is no longer the subjective evaluation of the manager—"a poor worker"—but the economic bankruptcy of the worker, to whom cost accounting has been brought. On the other hand, the income of leading specialists may be comparable to the cooperative wages. It would also be possible to make additional payments to the pensions of personnel who worked at the institute a specific time. It would be correct, in my opinion, when carrying out hiring, to draw up a labor contract for a specific period or for the period of the completion of a job. The Labor Code envisages this. The question of extending the contract would be settled by the council of the labor collective.

Such approaches in the intensification of cost accounting at the scientific research institute can, in our opinion, ensure the competitive ability of both stimuli and products. These, I dare say, are no longer simply experiments, but the development of the practice of the activity of enterprises under the new economic conditions.

7807

Chairman of Academy's New Ural Department on Progress, Prospects

18140005 Moscow PRAVDA in Russian 18 Aug 88 p 2

[Interview with Academician Gennadiy Andreyevich Mesyats, chairman of the Ural Department of the USSR Academy of Sciences, by PRAVDA special correspondents V. Danilov and V. Reut (Sverdlovsk): "At the Start of a Breakthrough. An Interview With Academician G. Mesyats, Chairman of the Ural Department of the USSR Academy of Sciences, and Reports From the Site of the Events"; date not given; first five paragraphs are PRAVDA introduction]

[Text] Before the interview Academician G. Mesyats, chairman of the Ural Department of the USSR Academy of Sciences, handed us two short information reports. It seems that the scientist did not doubt that they would make the proper impression. And he was not mistaken.

The first one with the title "Powder and Ceramics for Items, Which Have a Transition to a Superconducting State at 100 Degrees Kelvin" stated: "The Ural Plant of Chemical Reagents jointly with the Institute of Chemistry of the Ural Department of the USSR Academy of Sciences developed and introduced an industrial technology of obtaining powders and ceramics made of complex oxides, which it also is offering for sale."

The second one is entitled "High-Temperature Superconducting Materials and Items." It is stated in it: "The Pyshma Giredmet Pilot Plant has assimilated the production of high-temperature superconducting materials and items with a temperature of 90-96 degrees Kelvin

and can delivery to interested organizations: the source reagent—oxides of rare earth elements; finely dispersed synthesized powders made of a high-temperature superconducting material; items made of high-temperature superconducting ceramic in the form of disks, rods, plates, bars, rings, and hollow cylinders."

Thus, high-temperature superconducting materials and items are becoming products of industrial production.

But first about the department itself.

[Question] Gennadiy Andreyevich! More than a year ago, when the Ural Scientific Center and other academic subdivision of the region were transformed into the Ural Department of the USSR Academy of Sciences, its tasks and prospects were told about in PRAVDA. What kind of changes have occurred since then?

[Answer] In my opinion, quite significant ones. For as compared with the scientific center the department acquired far more rights in the settlement of scientific, financial, and economic questions.

Begin if only with the fact that in the Ural Scientific Center there were a few more than 10 scientific institutions, now in the department there are 38 of them, moreover, 12 have been newly established. In all they encompass a wide range of the natural and social sciences. In the field of mathematics and mechanics there are three institutes, the physical technical sciences—seven, the chemical sciences—also seven, sciences of the biological type—six, and the earth sciences—seven. The research in the field of ideology, history, national policy, and the legal support of restructuring is assuming particular importance—eight institutes of the humanities type will deal with these problems. The personnel of the department have also been reinforced. The number of academicians has doubled—we now have 10 of them and 29 corresponding members of the USSR Academy of Sciences. We invited a number of prominent scientists from Moscow, Leningrad, and Novosibirsk. It is gratifying that all academic science of the region—the former Ural Scientific Center, Bashkir and Komi affiliates of the USSR Academy of Sciences—has finally been united within the department.

[Question] But initially the Bashkir Affiliate rejected consolidation.

[Answer] Strictly speaking, the scientists themselves were not opposed. But at that time the parochial sentiments of the former leadership of the republic triumphed. Now the Bashkir Scientific Center in scale is second after the Sverdlovsk Center. Its chairman, Academician G. Tolstikov, was elected first deputy chairman of the Ural Department, while the chairman of the Komi Scientific Center—Corresponding Member of the USSR Academy of Sciences M. Roshchevskiy—was elected deputy chairman of the department. A new scientific center—the Perm Scientific Center, where with

respect to the state of academic institutions and the personnel the conditions for this for the most part had been prepared—was established. Representatives of the department are coordinating the work of institutes and other academic subdivisions in Izhevsk and in Chelyabinsk Oblast. The "germs" of academic institutes have appeared in Kurgan and Orenburg oblasts. We do not doubt that this "planting" with time will also provide good shoots.

[Question] At the 19th party conference it was again confirmed that the acceleration of scientific and technical progress is the basis of the economic and social strategy of the party. Positive changes have emerged in the development of science and technology, but for the present it has not yet been possible to change the situation radically

[Answer] I completely agree with this. And we are taking steps to increase the influence of science on the progress of production in the region. We believe that in each scientific center the directions, which are linked first of all with the specific nature of the local national economic complexes, will prevail. For example, in the Bashkir Scientific Center it is chemical research, which is connected with products of organic origin, as well as in the field of petrochemistry and catalysis. Here the level of development of geology, biology, and mathematics is quite high, these directions will also mature further. At the same time it is necessary to use more extensively the possibilities for research in the field of physics and machine building. In the Komi Scientific Center the work on geology, biology, and physiology is promising, but there is a great need for the development of socioeconomic research, as well as research in the field of chemistry, power engineering, and applied physics.

[Question] But might there not arise a focus on petty topics and the dispersal of forces and assets for the meeting of the immediate needs of various enterprises organization?

[Answer] They should not. United scientific councils for sciences, which are responsible for the development of their own fields of knowledge, have been set up in the department. These are the council for mathematics and mechanics, for the chemistry and chemical technology of inorganic materials, for biology, for the earth sciences, for the humanities, and other councils. Representatives of the corresponding academic institutes, higher educational institutions, and sectorial scientific research institutes are members of them.

[Question] What can be said about scientific research during the past year?

[Answer] I will dwell just on some. The research in the priority directions of solid-state physical chemistry, ion melts, solid electrolytes, and metallurgical processes, as well as on electrophysical methods of processing materials was continued. The task is the development of new

technologies and the improvement of existing ones in ferrous and nonferrous metallurgy, chemistry, and machine building. High-temperature fuel cells and power plants based on them were developed at the Institute of Electrochemistry. Now they are being improved. An all-union program, which this institute heads, was established for the problem.

But I regard as the main event the breakthrough of the science of superconductivity into the area of high temperatures. In significance it is possible to compare it with such achievements as, say, atomic energy, semiconductors, and lasers. On 17 February 1987, massive single-phase specimens of high-temperature superconductors with a critical temperature of 36.5 degrees Kelvin were synthesized for the first time in the country at the Institute of Chemistry (Sverdlovsk), while in late March specimens with a critical temperature of 93 degrees Kelvin were synthesized at the same institute.

[Question] The breakthrough is impressive. But it is also necessary to develop an achievement.

[Answer] Certainly. A scientific council for the problem was established in the department, then the Vysokotemperaturnaya sverkhprovodimost Temporary Collective, of which academic and sectorial organizations became a part, and, finally, the Impuls Scientific Center of the USSR Academy of Sciences were established with the support of the USSR Academy of Sciences and the Sverdlovsk Oblast Committee of the CPSU. While the technologies of producing high-temperature superconducting ceramics were turned over to enterprises, which assimilated them, to which their information reports also testify. Incidentally, it would be interesting for you to see these works.

And we went to Verkhnyaya Pyshma, where both enterprises, which under industrial conditions confirmed the breakthrough of the science of superconductivity into the area of relatively high temperatures, are located.

V. Sviridov, chief engineer of the Urals Plant of Chemical Reagents, related that the production of oxide powders was assimilated in October-November of last year. In consultation with the client they can be obtained with a transition from a normal to a superconducting state. What are the difficulties? There are not enough precision instruments for the determination of the characteristics of the output, there are few clients. The section of the production of these materials is capable of producing them in tons—for the present it is confining itself to tens of kilograms.

The Giredmet Pilot Plant began the output of high-temperature superconducting materials and items even earlier. The first batches were distributed for testing to various institutes free of charge—check them! The appraisals were ambiguous:

Good! Better than foreign specimens!

We are getting nothing, stop confusing people.

Both in their extremely opposite conclusions proved to be right.

At that time we did not have reliable means of determining the characteristics, the properties of the materials. That is why some got batches of good quality, others got "dummies." So now we are essentially still at the start of the path, which by no means is covered with roses, explains I. Pazdnikov, deputy chief engineer of the plant.

What is getting in the way?

Specialized equipment and instruments are necessary, but for the present neither is produced in our country. They denied us the acquisition of this equipment abroad. And in general the work is being performed essentially on enthusiasm alone. The plant has already spent about 600,000 rubles on this matter, having interfered with other directions, while we have received by the sale of high-temperature superconductors about 50,000 rubles. People vanish at the plant from morning to night, there is nothing with which to stimulate them materially. While you will not get far on "obsession" alone.

Of course, in our country not only the people of the Urals are working on the problem of high-temperature superconductivity. But this by no means justifies the difficulties, with which the industrial assimilation of the production of the latest materials precisely in the Urals is faced. Is this not how things also stand with the practical implementation of the developments of the Institute of Electrochemistry, which devised high-temperature fuel cells and power plants based on them? We decide also to visit this scientific institution.

Academician A. Baraboshkin, director of the institute, is not very inclined to idealize the progress of the work.

"We have learned rather well to create various plans," he notes, "but not always to fulfill them. Here in our program, which was accepted by the State Committee of Science and Technology and the USSR Academy of Sciences and in which a number of ministries have also been put to work, on paper everything looks good. The Ministry of the Gas Industry should have issued orders for the production of plants for a total of 3 million rubles. But when it got down to business, it allocated only 300,000 rubles. Why? The sector, they say, has changed over to cost accounting and self-financing, money is tight. True, the Ural Department of the USSR Academy of Sciences is helping us, but can it do much? A pilot base is needed, but there are not enough production facilities for it, people and equipment are lacking. Therefore, matters are moving slowly. Whereas just recently we were ahead of other countries in this direction, given such a situation it is also easy to lag behind. Of course, we are doing what we can. We developed a 300-watt plant, this year we will complete a 1-kilowatt plant, later there will be a 10-kilowatt plant."

But what about the USSR Ministry of Power and Electrification? For now this is already its job—to help you in all respects.

"It is willing to 'join in' at the level of plants with a power of not less than a megawatt. But can an academic institute really develop such units? Of course, in the various organizations, which are participating in the program, something is being done, but far from everything. With several we cannot conclude even a contract—there is nothing with which to pay for it. We turned with regard to these questions to the State Committee for Science and Technology, they allocated to us about 1 million rubles and also promised just as much for next year. They consoled us, hold out, they say, somehow a little longer, in the future, perhaps, it will be easier."

On what are these hopes based?

"Perhaps, it will be possible to 'fix up' something as state orders, then everything will actually be simpler. I believe that basic research and development in general need long-term financing. Constant scientific research is necessary so that the scientific reserve would always be 'marriageable.' For science is to some extent still a risk, and it is necessary to try to make it minimal, especially at the stage of practical application. Now we are 'eating up' the reserve that was prepared earlier. But there is an alternative direction which promises a more effective outcome. However, it requires research, an experiment. This is for the future, about which one must not forget.

"Thus, we familiarized ourselves with the progress of the solution of two important problems, which are of even more than regional importance—they are of national economic importance. Is that not why the difficulties, which it is not possible to overcome within the framework of and by the efforts of the region alone, are also arising before them?"

But let us continue the interview with Academician G. Mesyats, particularly with regard to these questions.

[Question] Gennadiy Andreyevich, the Ural Department was the first in the country to develop technologies of producing high-temperature superconducting materials. For this alone one should also afford it opportunities for the quickest development of the direction.

[Answer] It would be incorrect to say that too little attention is being devoted to this problem. In 1988 the State Committee for Science and Technology met practically all our requirements for basic research. Last year we immediately placed an order with the Urals Plant of Chemical Reagents for the production of these materials. And we paid the plant for our order ourselves. Everything speaks in favor of the fact that the enterprises, which have assimilated this production, will boost their reputation and will achieve a high quality of the unusual product. We intend to establish in the Urals the most

powerful scientific and technical center for high-temperature superconductivity. Now the efforts of five institutes and special design bureaus are already being focused on this new direction. They will also have the necessary pilot base.

[Question] What specific steps of restructuring in science have been taken in the department?

[Answer] I have already spoken about several. The increase of the role of the department in regional developments required closer ties with sectorial science. A council of directors of scientific research institutes has been established in Sverdlovsk, for there are more than 100 of these research institutes here. In it we discuss how to organize better the elaboration particularly of intersectorial problems. Engineering centers for the nondestructive testing of product quality, for automation, for the increase of the reliability of items, and others have been established. Cooperation with sectorial scientific research institutes is affording us opportunities in necessary cases to rely on their pilot works.

It is no less important to strengthen the interrelations with the higher school, and for this much is already being done. VUZ-academy laboratories and affiliates of chairs and educational scientific centers are being established, other forms of cooperation are being used. In general, in my opinion, the regional departments of the USSR Academy of Sciences should have "their own" universities of sorts. More precisely, educational institutions of dual subordination: on the one hand, to their own long-standing department of the higher school and, on the other, to the department of the academy. Then we will be able not simply to select graduates for ourselves, but to specify a list of specialties, in which it is necessary to train them. For example, in Sverdlovsk the Ural University could become such a higher educational institution."

[Question] To what extent has the material and technical supply of institutes improved?

[Answer] So far a "revolution" has not occurred in this matter. We produce several instruments and units with our own forces and assets, but our possibilities are limited. We have an extreme need for computer hardware. They promised to allocate to us for its purchase up to 1990 40 million rubles, but in 1988 allocated 200,000 rubles.

The development of the material and technical base of institutes of the department in many respects depends on the progress of capital construction. This year a laboratory building, in which research on high-temperature superconductivity will be launched, should be placed into operation in Sverdlovsk. In general the approved plans of construction of facilities of science envisage by 2000 to put them into operation with a total area of

about 400,000 square meters. I would like the planned volumes and deadlines to be kept to, but this, unfortunately, does not often happen.

[Question] The department is still growing. The housing conditions of personnel and their families should be improved, the spheres of service and services should be developed.

[Answer] As they say, there is still a heap of work here. Here even some doctors of sciences do not have apartments. Of course, we are obtaining some living space by means of deductions for the local soviets for the construction of social, cultural, and personal service facilities, but not very much. We are constructing something on our own. The RSFSR Council of Ministers and the USSR State Planning Committee promised to help in this matter, we are relying very much on their assistance.

[Question] The adverse situation, which has formed in basic research, which determines the prospects of science and scientific and technical progress, was spoken about at the 19th party conference. The need to develop a qualitatively new domestic scientific potential, without which it is impossible in a short time to achieve breakthroughs in basic research, was noted. What could you say in this regard?

[Answer] At the conference an analysis of the situation in science and the causes of the slowness of scientific and technical progress was given in a concise, but clear manner. The mechanisms of retardation are diverse and still very tenacious. They also exist in our department, we are striving to overcome them. But for its development science requires a specific material and technical base—hence, it is necessary to create it vigorously, of course, by the efforts of not only scientists themselves. It is necessary to improve the conditions of daily life for the people of science. Finally, it is necessary to use more quickly their achievements, developments, and breakthroughs in various fields of knowledge and technology, and not to await until these creative successes are repeated abroad or even simply become thoroughly obsolete. It is here that the mechanisms of deceleration are especially dangerous, for they are fraught even not simply with stagnation, but with an insurmountable lag.

7807

New State Interbranch Association "Kvant" Formed

18140016 Moscow VECHERNAYA MOSKVA
in Russian 8 Aug 88 pp 1, 2

[Article by A. Prilutskiy under the rubric "Restructuring: The Direction of the Breakthrough": "The First Soviet Concern"; first four paragraphs are VECHERNAYA MOSKVA introduction]

[Text] The other day the Buro of the Moscow City Committee of the CPSU endorsed the proposal of the collective of the Kvant Scientific Production Association

on the establishment of an interbranch state association. This is a new form of the economic organizational ties of a group of enterprises and organizations. Such ties are established for the combined accomplishment in the shortest possible time of important national economic tasks.

The tasks being worked on by the interbranch association are significantly broader than in the adopted organizational structure of the interbranch scientific technical complexes that are already operating in our country. Such an association is aimed at the development of new equipment and encompasses all the stages of the development of an innovation: from the origination of the idea to the series output of innovations.

Several tens of enterprises, which are located in 14 cities of 6 union republics, are being included in the association. And each of them retains its full economic independence.

Today on the second page of the newspaper we tell about the people and the plans for the future of the new association.

Perhaps for the first time in the 20 years of existence of scientific production association such public attention has been drawn to one of them—the Kvant Scientific Production Association. Incidentally, VECHERNAYA MOSKVA wrote back in January of last year about the fact that interest research is under way at the Kvant Association. Candidate of Economic Sciences G. Mikhaylova, deputy general director of the association, related at that time how at the scientific production association they were thinking of using the enormous scientific potential and of quickly developing and assimilating important products for the country.

What prevented this? First of all the lack of a mechanism, which could transform the scientific production association into a unified scientific production complex and orient it toward the achievement of the highest results. The Kvant Association proposed to organize the activity of the association on the principles of independence and cost accounting, to revise the methods of planning, and to establish new economic criteria of the work of both the scientific and the production spheres.

That is how the route of its development appeared to the collective 1.5 years ago. And so what? What seemed at that time the limit of the desirable has now become insufficient. That is how the new program, the implementation of which the Kvant Association has begun, originated. It is possible to specify the difference between them as follows.

From a Scientific Production Association to an MGO

An MGO is an interbranch state association. What is its distinction from traditional scientific production associations, of which the Kvant Association was until recently

a "typical representative"? They were established around a "brain center" (for the Kvant Association this is the All-Union Scientific Research Institute of Current Sources) and had attached to them an experimental base and a small pilot works. A gap appeared between the scientific production association and the series-producing enterprise. Science lived by itself, industry did too.

This situation did not suit the Kvant Association. Enterprises of 14 cities and 6 republics, which encompass all the stages of the development of a new item—from the origination of the idea to series output—were included in the first interbranch association.

Why did the Kvant Association need new partners? This need arose from the same cost accounting relations. It was calculated: the maximum profitability of a science-intensive product and, hence, the maximum profit are achieved during the first 5 years. Consequently, it is necessary to embody an idea in metal and in series-produced items and to "prop" it up with new developments.

In its former position the Kvant Association could not do this. The interests of industry, to which it turned over its innovations, differed from its own. It is a different matter if one is to act together, in an association. Incidentally, this is also advantageous to machine builders: it is not cheap to buy developments on the side.

Let us repeat, the Kvant Association has a powerful scientific research potential: 30 doctors of sciences, 400 candidates, and 72 winners of the Lenin Prize and the State Prize!

One of the numerous directions of research—galvanic cells—is being conducted at a high level.

Here is what Candidate of Technical Sciences F. Nabiullin, chief of the department of mass current sources, relates:

Reference. Faat Khatovich Nabiullin is a truly remarkable individual. He is a veteran of the Great Patriotic War, the winner of many combat orders, and a participant in the Parade of Victory. He has been at the Kvant Association 36 years. He developed equipment for the production of the first solar batteries. Now he heads the research in the area of galvanic cells. He is an Honored Inventor of the RSFSR and the author of about 200 inventions, which have saved the national economy many millions of rubles.

"The number of batteries in our homes is a quite accurate indicator of the development of the country. In developed countries there are 15-20 cells a year per capita, in our country there are 2-4. The need is enormous. The establishment on the basis of the Kvant Association of an interbranch center will help to saturate the market.

"Everything necessary for this exists. The ideas are first rate. The technology and design surpass foreign ones in novelty and reliability. Fewer such cells, which have a greater power capacity and life and are more inexpensive and economical, will be required.

"Next year we are starting to produce Prima-M batteries. The Lyuks battery is coming immediately after, such cells are not being made anywhere in the world! They are fed by atmospheric oxygen. Another series—the Ekstra for modern radio equipment, portable tape recorders, vacuum cleaners, and other impressive things—is in the works.

"All these, I will stress, are developments of fundamental novelty. More than 100 inventions are at their basis. But ideas—the most fruitful ones—are not a guarantee of their advance to the market.

"Our interbranch center is developing new cells, technology, as well as equipment for them. We also previously made machines for the production of galvanic cells. Now with the joining up of three machine building plants we will be able to place this work on a solid foundation. Soon we will create the first automatic complexes, by means of them we will be able to reduce quickly the battery shortage."

How the Concern Was Formed

Thus, the new association should draw the intellectual energy which has been accumulated over many years. The situation is typical of engineering centers. Truly powerful forces are concentrated there. But they are yielding the minimum practical return, which is far less than the best foreign firms.

The interbranch state association will become a testing ground of larger scale for the development of new methods of managing scientific and technical progress, over the entire chain—from the idea to the series-produced item. The economists of the association jointly with scientists of the Moscow Finance Institute initially formulated a set of standards, which are oriented toward the development of products needed by the national economy, the speeding up of their introduction, and the efficient use of manpower and material resources.

They specified the proportions of the scientific and technical output and the production engineering output, and prepared a statute on the structure and the procedure of management of the scientific production association.

As a result the Kvant Association will appear as an association of specialized scientific production enterprises, which is fundamentally new in our national economy. Temporary scientific production collectives (VNPK's) are being set up in it for the accomplishment

of specific tasks. Prior to this individual laboratories with a fixed staff of associates were the base ones here, just as everywhere in scientific production associations.

Now the partners get together for a specific period. After you have done your part of the common job and have turned it over to a colleague in the temporary scientific production collective, you take up a new theme and join another temporary collective.

They arrived unexpectedly at temporary scientific production collectives. When they began to break in the initial organizational structure in the subdivisions, in one of the departments, where graduates of the Physical Technical Institute were selected, they greeting it, to put it mildly, coolly. "We will organize the work ourselves," the lads said, "just do not tie our hands with unnecessary instructions and instances." At first these objections were not taken seriously. But then they began to find in them more and more reason. In the end they decided to take them as the basis.

There was another reason to listen to the voice of young people. It turned out that the largest turnover is among specialists up to the age of 35. Each year 300 young engineers were released! Why? Did they not see prospects for themselves and not sense attention and interest?

At the Kvant Association they are seriously counting on young people. Not only on their enthusiasm, but first of all on their lively intellect and on the aspiration to take the unbeaten path and to seek out of the ordinary solutions.

The remuneration in temporary collectives is also founded on a fundamentally new basis: not for the serving of time, but for the result. A fixed share of the profit—from 5 to 30 percent—has been established for each temporary scientific production collective.

And another thing. It is possible to belong to two or three temporary collectives. Such activity is simply encouraged.

The Subordination Syndrome

Restructuring at the Kvant Association is directed toward the independence of people and is sweeping away the stereotype of subordination, which has become ingrained in the consciousness of many people. It is also appearing at the supervisory level and in administration services and is tenacious among the majority of specialists. Not everyone at the association imagines how the new mechanism will work and how to take advantage of the democratic principles of management. The school of democracy for first-class engineers proved to be almost more difficult than the vocational school.

Its first lesson: to make all the most important decisions publicly, to "escort" them through meetings, and to select them in a democratic manner from several versions and candidates. While the homework on this lesson—various schools and seminars, round tables and business clubs—should provide the ability to analyze the economic and social situations and to develop the skills of independence.

The destruction of the stereotypes of subordination is a lengthy process and requires patient internal work. But this process has been started and is already yielding a result.

The first step was taken when the status of temporary collectives was being discussed. Is one to reject stability and a permanent honorable place? For the sake of what? In order to work more successfully, in order to live not semi-intensely, not at one-fourth capacity. So that the content of labor would correspond to the words "scientist," "engineer," and not to the notorious "performer," which is very popular at institutes. At that time these conclusions were taken more on faith. The future will complete cost accounting. Everyone is equal before it. Even the personnel department is now organizing its work on an economic basis, bearing material liability for the formation of a higher quality staff of researchers, designers, process engineers, and other specialists of the association. There is a particular demand for skillful managers, who understand both the scientific and the organizational problems that face the interbranch state association.

"We have said much about the importance of cultivating among people the sense of being the master," party committee secretary V. Tarasov relates. "And we tangled their arms and legs and deprived them of independence. It turned out that in order to educate a master, it is necessary simply to become him.

"The restructuring under way in the country, by developing democratization, glasnost, and economic reform, is returning to people the natural thirst for freedom of actions—without nagging and 'education.' It is making it possible to show oneself to be the real master of the country.

"People see: their well-being and occupational and social status depend on themselves. But for the present not everyone sees this. How is one to convince the skeptics?

"Life and the conditions of the labor, daily life, and relaxation of people, which are changing before our eyes, give us arguments in party work. A social development service is operating, the construction simultaneously of several social facilities—a House of Personal Service, an educational center with a swimming pool, and a medical and public health unit—is being carried out vigorously.

Each of our enterprises has a similar program. Together we intend to build a vacation center on the Black Sea, the Baltic Sea, and Lake Seliger, to develop collective horticulture."

When people feel confident and settled, things also go better for them. Tension, constraint, and the fear of saying and doing "the wrong thing" "the wrong way" diminish.

Today you will not surprise anyone with an experiment in the economy. Reports on interesting, bold initiatives, which are paving the way to what is new, arrive every day.

But here, too, the research of the Kvant Association will attract, undoubtedly, universal attention.

In the country there has not been such an association—essentially the first Soviet concern which has united together the interests of science and production.

The Kvant Association has set lofty goals for itself, the set pace is intense, the novelty of the outlined path is inspiring. VECHERNAYA MOSKVA will return to the work of the association, tell about its affairs, concerns, problems. Let us wish it success!

7807

Cost-Benefit Analysis Lacking for Major S&T Projects

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in Russian No 14, 19 Jul-1 Aug 88 pp 4-5

[Article by G. Sidorova under the rubric "The Problem Close Up": "Economics, Pride, and the Method of Cost-Benefit Analysis"]

[Text] When speaking about acceleration, people frequently recall the formula of Academician Glushkov: a necessary idea at the necessary place and the necessary time. That is how he defines the basic principle of success in scientific and technical progress.

During the period, which our industry is shifting from administrative command methods of management, such an idea exists. This is the method of cost-benefit analysis.

Cost-benefit analysis originated during World War II, when under the conditions of a shortage of material and technical resources and time it was necessary to find quickly effective engineering solutions. Designers (assuming that this is a temporary step) sought inexpensive substitutes of expensive and simply nonexistent materials. Precisely at that time, for example, Soviet aircraft builders for the production of individual parts of machines instead of bronze began to use cast iron. A similar search was also made in other countries.

After the war specialists of the American electrical equipment firm General Electric headed by L. Miles engaged in the analysis of the performance of "substitutes." And it turned out that the changeover to more accessible and inexpensive materials not only did not worsen the technical characteristics of machines, but in several cases even improved them. Thus the assumption: in every, even well-developed design there are reserves of improvement, was confirmed.

In our country in the late 1940's Yu.M. Sobolev, a designer of the Perm Telephone Plant, devised the method of the element-by-element development of a design. He proposed to examine each of them separately, having divided them according to the principle of operation into basic and auxiliary elements. From the analysis it became clear where the excess costs were "hidden." Sobolev applied his method to the mounting attachment of the hand set and he succeeded in shortening the list of used parts by 70 percent.

The method, which is now called cost-benefit analysis, was thus formed on the basis of the work of Miles and our fellow countryman Sobolev. What is its basic content?

When modernizing series-produced items and designing new ones each assembly is examined from two points of view: what function does it perform, is it possible to do without it or to combine it with another; what does this cost. Engineering is thus "merged" with economics. The design ceases to be omnivorous (the developer uses not any materials and not also solutions, but those that are more reliable and less expensive), the product becomes, as a rule, of better quality, tens of thousands of tons of raw materials and millions of kilowatts of electric power are saved.

Years passed. The area of application of cost-benefit analysis expanded. Now by means of it, for example, problems of environmental protection are being solved. Specialists have developed a new form of analysis—functional-ecological analysis (FEA), when in an item not the zones of excess costs, but the zones, which are the sources of the most dangerous emissions, are determined and the causes of their formation are established. Cost-benefit analysis can suggest how to manage an enterprise more efficiently and to organize properly the interrelations between its services. The method is being used in construction and trade. And this is far from all its possibilities.

But wherever the method is used, it manages everywhere to combine what would seem to be incompatible: to increase the quality and competitive ability of an item and at the same time to decrease the expenditures on its production and use; to increase production efficiency and not to increase in so doing the consumption of material, technical, and manpower resources. In short, cost-benefit analysis proved to be the key to the anti-expenditure mechanism.

Let us stipulate that cost-benefit analysis is not a panacea for all troubles. But to underestimate and especially to ignore the method is just the same as to pick one's own pocket. A ruble invested in the "analysis" is returned many times over. For example, in power machine building the return from cost-benefit analysis per ruble of expenditures is 5-7 rubles, in the electrical equipment industry it is from 10 to 20 rubles. While foreign experience shows that the return can also be greater.

In industrially developed capitalist countries the method spread quite rapidly. It was enough for a company to be convinced just once that cost-benefit analysis works for a profit.

An interesting example from the practical experience of one English electrical equipment firm is well known. Its engineers for a long time attempted to decrease the cost of the production of the piston of an electrohydraulic pump for an aircraft engine. Finally, having despaired, they turned the problem over to a cost-benefit analysis group. There they sought a solution by a nontraditional method and found that without detriment to the design it is possible to replace the piston with a steel ball. The cost of this ball was only 4 percent of the cost of the piston. But not only this percentage convinced the company. It became evident that by means of cost-benefit analysis it is possible with a fewer number of people (but trained people) in the shortest possible time to obtain the most efficient solution of an urgent problem.

Cost-benefit analysis is being used actively in Japan. Some 80-90 percent of all items and all 100 percent of those for export undergo "analysis." And inasmuch as the goods of this country do not need special advertising, judge for yourself why Japanese industry took up the method.

In industry of socialist countries—Poland, Hungary, Czechoslovakia, Romania, the GDR, and Bulgaria—cost-benefit analysis has been legalized and is regulated at the state level.

In our country the Ministry of the Electrical Equipment Industry was the first to introduce cost-benefit analysis in 1977 and in a few years achieved striking results in the saving of raw materials, power, and manpower resources. In 1982 the CPSU Central Committee commended the experience of this sector and recommended the method for dissemination. At that time they engaged in earnest in its use in power machine building and several other sectors, but for the country as a whole cost-benefit analysis had still not become an everyday tool in the work of designers and process engineers.

In 1985 and 1987, I had occasion to attend two symposiums on cost-benefit analysis. An all-union one in Riga and an international one in Moscow. The following picture appeared: there is an effective anti-expenditure mechanism, there are specialists who know how to use it, there is uncoordinated successful experience. While on

the other hand there is our national economy, in which cost-benefit analysis is a small point on a large map. In short, at both symposiums one of the discussion themes was invariably topical: why the method is being poorly introduced in economic practice. And they named the same reason for this, the primary one: the managers of enterprises and organizations do not know cost-benefit analysis and do not see its possibilities and prospects.

Indeed, in the interrelations with the method of both the manager and the rank and file designer there is very much that is subjective. J. Antoszkewicz, a specialist of the Institute of Administration and Management of Poland, spoke in an interesting manner about this:

"The reasons are in the subconscious reluctance of managers and technical personnel to engage in systematized productive thinking. Moreover, they believe that they will be able to venture to use the method only after all the most urgent needs of the enterprise have been met. As before poorly designed items and the further increase of costs, if not at the enterprise itself, then in the process of use, are the consequence of such a stand."

What would you add here? It did turn out that from the very start enthusiasts—people with a special kind of character and spirit, who in general are also capable of and like taking risks—understood and promoted cost-benefit analysis. But for the present there are few such people.

Let us ask ourselves a question: Why did the Ministry of the Electrical Equipment Industry introduce cost-benefit analysis? Undoubtedly, the managers of this sector were more far-sighted than others were. But it is a matter not only of this. The sector operated under the conditions of the economic experiment. At one time a task was posed for it: to provide the entire increase of the output being produced by means of saved resources. The system of material stimulation was also organized accordingly. Such a method as cost-benefit analysis was precisely able to provide advantages. And they introduced it. Owing to this during the last five-year plan the enterprises of the sector decreased the cost of the output being produced by more than 130 million rubles, saved over 42,000 tons of rolled ferrous metal products, and conditionally released nearly 6,000 people.

Other enterprises did not work under such conditions and there was not reason for them to introduce cost-benefit analysis. Therefore, many managers of enterprises (in spite of orders from above) rejected the method.

The idea is not a new one, but it is being confirmed more and more by the practice of our life: any innovation is viable only if it is advantageous to the production collective, the sector, and the state. As soon as this triad is upset, there is no progress. The old methods of management constantly knocked out of the chain the first link—the enterprise. How many articles at one time

exposed managers in a rut, who do not like technical progress. Finally, they arrived at the economic causes: it is unprofitable to engage in the introduction of innovations. The reward does not cover the material and moral expenditures.

The same causes held cost-benefit analysis back. Since the price is linked with the cost price, it is unprofitable to decrease production costs. If you decrease the cost of a product, the production volume declines, it is necessary to get more of it.

Do many people know that Yu.M. Sobolev, one of the two founders of the anti-expenditure method, which the entire world is using, lives in Perm? Have the directors of large associations turned to him many times for specific assistance and advice? Meanwhile in the GDR, for example, they know Yuriy Mikhaylovich well. The cost analysis being used there is based on the works of Sobolev.

The economic mechanism that existed required the good execution of orders, but did not require creativity in work and did not require one to be for scientific and technical progress in practice. Therefore, such natural geniuses as Sobolev could try in vain for decades to get their ideas through.

With the changeover to the new system of management the fate of cost-benefit analysis should change. The method by its nature is in harmony with economic approaches in management. If you want to derive a profit, save. And inasmuch as no other means of decreasing costs yields a greater saving than cost-benefit analysis, introduce it.

Everything seems logical and simple. But if only everything were so simple. The old methods of management left a mark not only on the practical results of the economy, but also on the psychology of the manager and the specialist and developed specific stereotypes of the attitude toward work and toward creativity. When except for the plan they did not make one answer for anything, it was possible simply to ignore this other thing. Highly efficient inventions were not introduced for decades, but did anyone ever answer for this? Checks established that developed new equipment at times is even not a rival of equipment of yesterday in the West. And again no one was made responsible. While when they do not require anything of you, you also will cease to demand anything from yourself.

Yes, of course, the economy should be most receptive to technical progress. And the material stimulus is a great thing. But not only it determines the content of engineering labor and the attitude toward one's own work. Let us face the truth: if today very high salaries were set for all engineers, what, would they begin tomorrow to develop equipment of the highest level? Hardly.

We having been talking much about the human factor. To create the conditions, to facilitate labor, to increase the wage, to make it possible to show what one can do. But the human factor is also the making of oneself responsible.

On what did the method get stuck? On the one hand, they did not know it, and now still know it poorly, while, on the other hand, it turns out, they do not like the method. Precisely those, who develop new equipment, do not like it. Of course, it wounds your pride when in your item they find a large number of defects. But for some reason it is convenient—and pride does not suffer in this case—to pass off old things as new equipment and not to pay a ruble for this.

I do not have anything against pride. It is a natural feeling of every creative individual. But it should be active. A properly proud person always strives to leave his own mark, but a good, vivid one. In such a person another feeling—conscience—always lives alongside pride. One should be just as ashamed to design bad equipment as one is ashamed to bake bad bread and to sew bad clothing.

I had occasion to become acquainted with Yu.M. Sobolev. In one of the conversations he voiced the following idea: "A designer should be touchy. For if he makes a mistake in a design, in series production it will be repeated tens of thousands of times."

Last year his new book "Konstruktor i ekonomika. FSA dlya konstruktora" [The Designer and Economics. Cost-Benefit Analysis for the Designer] was published. In it, in particular, Sobolev names as one of the causes of the designer's rejection of the method economic ignorance and the inability to think in economic terms.

He writes, for example: "For the present designing without the economic substantiation of the decisions being made is current. By examining the nature of economic defects, we can come to the conclusion: the primary cause of their appearance and existence is explained by the fact that the question of the mandatory introduction in the daily practice of designers and process engineers of some method, which enables the author of a development and the process engineer to identify easily, quite quickly, and in a sound manner an economic defect and to eliminate it, has not been settled."

The paradox of today is: we are entering a period of economic interrelations, being ourselves economically semiliterate. But if we do not know how to do something, let us learn, let us pursue the experience of using the anti-expenditure method, since it exists in the country.

Is it possible to save a lot on the production of a children's toy, for example, an automatic pistol? Imagine that it is possible, and quite a lot. Specialists of the Latvian Straume Plant made a cost-benefit analysis of this toy. The analysis showed: the bonding of the housing

is the most labor-consuming operation. Then they proposed to make the parts of the pistol in a single mold and, without removing the gates, to apply a metal coating to them in a vacuum unit; to eliminate bonding altogether and to bond the parts by catches. It was also proposed to sell the pistol in two versions: with assembly at the plant and with assembly at home (as a construction kit for the child).

After making the cost-benefit analysis the number of parts of the pistol was reduced from 11 to 5. The economic impact is 11,000 rubles, while the expenditures on making the analysis came to only 250 rubles.

At the Izhorskiy zavod Production Association they selected as the object of the analysis the interaction of the railroad shop with the metallurgical works. Here both subdivisions were examined not as accordingly organized objects, but as complexes that perform specific functions. Many unnecessary functions, which lead to excessive expenditures, were identified and the lacking functions were determined by the method of cost-benefit analysis. For the most part they concerned the organization of production. For the improvement of the interaction of the shops 35 measures were planned. The main ones of them reduced to the inclusion of rail transport in the unified technological process of steel production.

As a result the losses from the layovers of cars were reduced by 210,000 rubles, the losses from the repair of cars were reduced by 180,000 rubles, while the fines for the layover were reduced by 65,000 rubles. The total economic impact is estimated at 2.2 million rubles.

And there are hundreds of similar examples. Practice long ago had already answered affirmatively the question: "Is cost-benefit analysis needed?" Speaking at an international symposium on cost-benefit analysis, specialists from the GDR noted: "The understanding that over many years it is possible to increase the production volume and the national income, while reducing in so doing the consumption of power, raw materials, and materials, is among the most important results obtained by us in past years in the GDR economy. The reduction of production consumption to a great degree was a consequence of the use of cost-benefit analysis. In this area we need any possible impact, even an apparent small saving, since on the scale of our national economy such amounts add up to millions and billions."

But our resources also are not unlimited. We, too, need any possible impact. Both on the scale of the country and on the scale of each specific enterprise. This is especially important to those which have changed over to the second model of cost accounting. Therefore, the attitude toward the method should also change radically.

An interview with V. Prosyanyk, chief engineer of the Kishinev Progress Introducing Firm, was published in No 24 of our bulletin for last year. He said that, when accepting an order for a development, the specialists make without fail a cost-benefit analysis, although no one forces them to do this. As Prosyanyk explained, first,

the economic thinking, which was developed by the long-standing practice of using cost-benefit analysis, is "to blame," while, second, the cooperative is not interested in excessive expenditures. Here they are well aware that under the conditions of competition the enterprise or cooperative, the item of which is of better quality and is less expensive, survives. But if we want to appear on the world market, it is practically impossible today to do this without cost-benefit analysis.

Abroad firms offer the consumer not a specific item, but the performance of the functions that interest him. But the form of the object in this case can be most different. Therefore, from the point of view of cost-benefit analysis, even the best analog is not a guideline for a new development. Cost-benefit analysis is the bridge to designing without an analog, which makes it possible to develop "unheard of machines." Cost-benefit analysis thereby not only raises the equipment being development to a qualitatively new level, but also changes qualitatively the very nature of a designer's labor, forcing one to be a creator.

The method has gone forward, without waiting for universal recognition. To catch up or not catch up with it—now no one is issuing instructions from above to enterprises in this respect. Perhaps, now someone will also reason as follows: we worked without cost-benefit analysis, we will also get by in the future. So what, it is possible to get by. But this will be just the same as stubbornly making the most difficult calculations on one's fingers in the age of computers.

But this will cost too much in the most direct sense of the word. Specialists have determined: it is one-tenth as expensive to eliminate one mistake at the stage of research and development than to eliminate it in the sphere of production and one-hundredth as expensive to eliminate it then than in the sphere of use. The method of cost-benefit analysis has been known for 40 years. Who will calculate how much in these year we have lost on design mistakes, which might not have existed?

**GKNT Chairman Tolstykh Discusses
Transition to Self-Financing**

18140001 Moscow NTR: PROBLEMY I RESHENIYA
in Russian No 13, 5-18 Jul 88 p 3

[Article by Deputy Chairman of the USSR Council of Ministers and Chairman of the USSR State Committee for Science and Technology B.V. Tolstykh: "The Difficult Transition"; first paragraph is NTR: PROBLEMY I RESHENIYA introduction]

[Text] B.V. Tolstykh, deputy chairman of the USSR Council of Ministers and chairman of the USSR State Committee for Science and Technology, comments on the first results of the changeover of scientific organizations to full cost accounting and self-financing.

Among the main difficulties is the short time of preparation for the transition. Only 3 months were provided for it.

Further, in contrast to production, where the new economic mechanism underwent during the period of 1985-1987 multistage experimental checking—first at a number of large associations (enterprises), then in several ministries—in the scientific and technical sphere there was no such experience.

The lack of proper preparation of personnel also played its adverse role: meetings with scientists testify to the inadequacy of the knowledge of the basic provisions of cost accounting even among the specialists who are called upon to carry out the changeover of scientific organizations to the new conditions of management.

Add here the scale of the changeover: more than 1,200 scientific collectives of 23 sectors of the national economy changed over simultaneously to the new conditions. Psychological barriers, the lack of development of methods, and the adverse financial status of a number of potential clients of scientific and technical products, which is due to their failure to fulfill the plan assignments on production and the profit, are also present.

I believe that considerable difficulties, but already ones that are connected with the debugging of the new economic mechanism, also await us in the future.

In March of this year, 14 brigades made up of responsible officials of the USSR State Committee for Science and Technology, ministries, and departments, scientists, and specialists of enterprises and organizations studied the first experience of the work of scientific collectives under the new conditions of management: they familiarized themselves in 20 cities of the country with the activity of more than 200 scientific organizations.

The first results of the transition were discussed at all-union conferences in Moscow and Vilnius.

Of course, 5 months of work is obviously inadequate time to reveal all the potentials of the new economic mechanism in science, which in its essence is based on factors of a long-term nature. However, the conducted investigation makes it possible already today to give the first expert appraisal of the changes in the life of scientific collectives.

First of all the changeover to the new conditions of management is making serious adjustments in the interrelations between the developers and clients of scientific and technical products. This appears especially noticeably in the interactions of scientific organizations with the enterprises that are working with them in accordance with direct contracts. On the part of the latter the demandingness on the technical and economic level of developments has increased significantly, the monitoring of the substantive aspect and the cost of the contracts being concluded has been tightened up. Many of the clients required the time of the development being conducted to be shortened.

The attitude of clients toward the subject of the contract has changed radically. Whereas previously they tolerated the fact that many studies concluded with reports, the elaboration of a regulation on designing and of technical requirements, and, at best, prototypes of new items and materials, under the new conditions each of them is striving to obtain a product that is ready for immediate use or duplication.

Hence the more demanding selection of contractual themes: at the inspected organizations about 18 percent of the contracts concluded earlier were not drawn up again because they do not satisfy the requirements of the consumer.

At the same time, whereas the interconnections of scientific organizations with enterprises are becoming more efficient under the new conditions and are based on direct economic contracts, the interrelations of organizations of science with their superior organs for the present still remain not completely adjusted. Not all workers of ministries were psychologically prepared for the realization of equal interrelations with scientific organizations. Of the contracts, which have been concluded by scientific research institutes and design bureaus with their ministries, 65 percent do not envisage obligations of the latter on the observance of the contract.

Today the problem of establishing the optimum ratios between centralized and decentralized sources of the financing of science is very urgent. The logic of cost accounting requires, on the one hand, the concentration of a larger portion of the assets in the hands of the immediate clients of the work—enterprises and associations—and, on the other, the centralization at the disposal of the ministry of a specific portion of the assets for the financing of work of general sectorial importance.

Owing to the fact that ministries overstated the amount of assets for the financing of research and development in the centralized funds, the USSR State Committee for Science and Technology and the USSR State Planning Committee jointly with the permanent organs of the USSR Council of Ministers performed work on their reduction. The question of the amount of centralized assets for the performance of research and development aroused a pointed dispute among specialists. Ministries, not wishing to relinquish these assets, are substantiating their stand by the large amount of general sectorial work and the lack of assets for its performance. This stand from a state point of view does not satisfy the requirements of the increase of the role of the consumer in determining the themes of work. Economic science thus far has not given us if only approximate guidelines, which should be made the basis when determining the optimum proportions in the amounts of assets, which are deducted for the centralized funds of ministries.

The attempts of ministries to extend to research collectives the system of planning, which is envisaged for industrial enterprises, and their aspiration to ensure the plan on production by the mechanical inclusion of the scientific and technical output in the volume indicators of the activity of the sector are also arousing anxiety.

Several ministries as before are obliging scientific organizations to work "for themselves," often without providing them with the necessary financial resources. This diverts people from the basic work on the development of new equipment, the basic principle of cost accounting—the independence of scientific organizations when formulating the thematic plan of work—is also violated.

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Ramifications of Introduction of Cost Accounting into Science

18140251a Moscow ARGUMENTY I FAKTY
in Russian 27 Feb-4 Mar 88 pp 2-3

[Interview of Boris Leontyevich Tolstykh, chairman of the USSR State Committee for Science and Technology by correspondent of ARGUMENTY I FAKTY: "Science and Cost Accounting"; first paragraph is source introduction]

[Text] B. Tolstykh, chairman of the USSR State Committee for Science and Technology, responds to the questions of a correspondent of ARGUMENTY I FAKTY.

[Question] Boris Leontyevich, readers often complain about the inaction of a number of scientific-research institutes and raise the question of liquidating them. Is this practically possible?

[Answer] We analyze once every two-three years the work of scientific institutions in each sector. In addition, the ministries and departments themselves monitor the

work of their scientific-research institutes. But what is the effect of such monitoring if, for example, we find in observing one institute—the All-Union Scientific-Research and Planning-Design Institute for Complete Production Lines of the USSR Ministry of Chemical and Petroleum Machine Building—that according to reports developments for 57 themes were introduced, but in reality the figure was only 7. Are the rest only false indicators? There were 176 supervisors for 71 personnel. Or Gipronil'mash [State Scientific-Research and Planning-Design Institute for Machine Building (?)] of the USSR Machine Tool and Tool Building Industry—of a thousand persons only 10 had a degree, and themes were repeated from year to year. In 9 years the institute's staff personnel produced a total of two author's certificates.

On the suggestion of our committee, the USSR Council of Ministers closed down these institutions.

[Question] And what happened to their staff members?

[Answer] They found jobs according to their specialities in other organizations and in production. But I want to say that we will not be able to cure the lingering disease of sectorial science—its weak payback—by means of such an administrative command method. "To close down," "to forbid" or "to abolish" is not difficult. It is more difficult to teach how to work with high efficiency. And this is the most radical route—conversion to economic methods of management. With the introduction of the new conditions of management, results of the work of cost-accounting scientific organizations are becoming a commodity which, depending on quality and assortment, is or is not in demand.

[Question] The question is as I understand it of converting science to cost accounting?

[Answer] Precisely. An enterprise or plant acts here in the role of a purchaser. If it needs new technology or special equipment, it directly concludes a contract with a scientific-research institute. But to the extent enterprises are self-supporting, then, believe me, the sums of money for research work and requirements for fixed times and quality of developments will be maximally strict.

Under such conditions, the maintenance of an idle staff becomes practically impossible, as was the case sometimes formerly when money for science was allocated from above in a centralized manner.

[Question] Boris Leontyevich, a scientific-research institute will now pay both for capital and for manpower resources. But this will increase the cost of research and under the new conditions these deductions will especially aggravate the financial problems of the institutes.

[Answer] At first there were such misgivings, but practice has shown that it is not at all like that. For example, at one machine-building scientific-research institute, they

were getting ready to purchase six computer complexes, but after adding up the cost of the capital, they not only rejected it but even decided to sell an already existing unit.

[Question] But is this not to the detriment of research?

[Answer] They simply installed order in operation of the existing complexes and set up three-shift work for them.

[Question] After all, scientific research frequently requires very expensive special-purpose instruments.

[Answer] Let science convince the manufacturer that such an instrument is needed and that it will help production to make this item competitive. And after effective utilization of this instrument, it will be sold. Any intelligent director of a plant will not object. Incidentally, a great number of machine tools of earlier developments have accumulated in the yards of machine-building scientific-research institutes. All this rubbish has been lying there for years. Now it is quickly put in order and sold. Dead capital is resurrected. There is also another possibility—to create centers of joint use for the most expensive instruments.

[Question] Very likely, pay for manpower resources will involve incentives to a more thrifty attitude?

[Answer] First, acceptance of people will be curtailed—this is also an answer to the first question of your readers. Second, acceptance will proceed more carefully, in a differentiated manner, with the use of reliable tests. The future staff worker will have to provide a significant return.

[Question] By the way, what is the present effectiveness of our science?

[Answer] It varies greatly depending on regions and sectors. For example, VUZ science produces a 1.7 ruble return for every invested ruble, the figure for young science in Siberia is 2.5 rubles. The transfer of science to cost accounting, to direct relations with production will undoubtedly sharply boost its return.

[Question] But if scientific-research institutes and enterprises will start to operate on direct contracts and if a self-regulatory system emerges, what then will be the role of the Committee for Science and Technology?

[Answer] This year more than 1,200 institutes will convert to cost accounting—this is a big share, but not all. Furthermore, in those collectives which have gone over to cost accounting, the portfolio of orders will be formed on the basis of direct contracts, in some cases amounting to 80 percent, and the rest on the basis of state orders.

This means that as before we will continue to have problems of determining priority of research, proper allocation of monetary resources of state orders and timely orientation of scientific collectives toward major themes with a quick economic effect.

It should be said that in distinction to industry, science has not undergone corresponding experimentation and testing in regard to conversion to the new conditions, consequently we are learning as we go along. In China, where this problem started to be resolved earlier, they consider possible full conversion of science to cost accounting in the course of the next 3 years.

We have maximally reduced the committee's apparatus, but nonetheless are setting ourselves the task to continuously develop new forms and to improve the economic mechanism. Moreover, we need to relate to and coordinate our own problems and successes of Soviet science with the development of world science, but the main thing is that we now have behind us the development of the Comprehensive Program of USSR Scientific and Technical Progress for 20 Years.

[Question] But what are the first practical steps of the transition of science to the new economics? Will not scientific-research institutes be no better off than before?

[Answer] Scientific collectives of the machine-building complex, for example, have filled the portfolios of their orders with two-thirds consisting of direct orders and one-third of state orders. We believe that with time, state orders will not be more than 20 percent.

I can say in general, that a strong and sound science does not look for a customer, he himself comes to look for it.

[Question] Take a kolkhoz or sovkhoz—it is not in a position to order the development of a combine or tractor suitable for local conditions. A centralized order, perhaps? We know what this has resulted in—tens of years of marking time, piles of metal on fields or in ravines.

And a "customer" will hardly be found for archeological excavations or, let us say, for a theory of the origin of the world.

[Answer] Today at academic institutes, direct contracts make up about 15 percent. We think that their volume under the new conditions will double, but all the same basic research will be financed centrally. Such is its specific character.

But the interests of a kolkhoz must be upheld by regional agroindustrial committees. Specific combines are needed for the whole region, and an order can be put out by pooling money together.

[Question] Boris Leontyevich, there is a long-standing question which is painful to refer to but it is one which concerns many readers. We will be dealing with the travails of inventors. Because of the struggle for the "honor of the uniform," valuable inventions will be lost in the depths of various scientific-research institutes, and it is hard for one to conceive the losses.

[Answer] Right now the "Law on Inventions" is being discussed with representatives of the broadest public. The new legislation is closer to international rules and provides more benefits and rights to inventors, while the procedure of protecting the rights of inventors in the courts is being improved.

But the main significant consideration is that economic levers for management of science will now oblige scientific-research institutes to look for such inventors with their valuable ideas and ready developments. After all, the better an invention is, the more quickly and effectively will it be introduced and the more money will remain with the collective of the scientific research institute for salaries, development and social-cultural and personal services.

[Question] For the time being, inventors realize their ideas through cooperatives and other public organizations.

[Answer] Although we have to guide scientific and technical progress as a whole, globally, we still provide the broadest possible support to the few cooperatives, centers of scientific and technical creativity for youth (NTTM) and temporary scientific and technical collectives. We are entirely for the development of introductory, production and engineering cooperatives. The Kiev Polimer mash Cooperative is an example. Not everyone actually believes in the results they have achieved.

At the USSR State Committee for Science and Technology, a special group has been created which works on the elimination of all hindrances on the path of development of public technical organizations of various kinds.

[Question] It is gratifying that conditions are being created for youth for working in centers of scientific and technical creativity. But how the introduction of young people proceeding at scientific organizations?

[Answer] Youth is characterized by daring and dynamism. Consequently the influx of young people into science inevitably will result in a qualitative jump in its development.

At academic institutes, an age limitation has now been introduced (65 years) for filling supervisory positions for all with the exception of academicians and corresponding members. And the latter can administer only to 70 years of age. After that they can devote themselves solely to science or training of personnel.

[Question] But is there a systematic search for talented young people and their advancement to leaders of science?

[Answer] Interesting work in this direction is being done by the Moscow Physico-Technical Institute: it organized trips of selection commissions to Vladivostok, Khabarovsk, Chelyabinsk, Krasnoyarsk and Kiev where about 100 students selected.

Novosibirsk University conducts selection of gifted youth through specialized schools.

Incidentally, one of its graduates, Yu.L. Yershov, defended his candidate's dissertation one year after graduation and his doctoral after two. He is now a corresponding member of the USSR Academy of Sciences and rector of this university. Together with Doctor of Physico-Mathematical Sciences Kotov, he developed an original computer with an extraordinary high speed of operation. Here you have an example of a young leader in science.

[Question] Boris Leontyevich, readers are interested—is it true that the pay of a doctor of sciences is greater than the pay of a minister?

[Answer] The question is not quite right, especially since it is not so rare for a doctor of sciences to be a minister.

The fact is that only the position or the amount of work is remunerated rather than the degree itself which provides the possibility of aspiring to the position.

If a doctor of sciences heads a department or institute of the highest category, his salary can be as much as 600-700 rubles a month. This, of course, is more than the salary of a republic minister. But for the position of senior scientific associate the minimum salary is 250 rubles.

[Question] Incidentally, readers ask—why do scientific-research institutes of the first, second and third category exist? Is there actually a science of a first or third category?

[Answer] At the present time, there are practically no third-category institutes. But varying scope and depth of research, the presence of experimental production and much introductory work or the absence of such determines the difference in level of pay, benefits and advantages. Priority and effective work will always be better paid. Economics itself requires that.

Actually, the whole intent of the reform we are carrying out is to provide a way for everything that is new and progressive.

Scientific Research Institute Details Experience With Self-Financing

18140324 Moscow NTR: PROBLEMY I RESHENIYA
in Russian No 12, 21 Jun-4 Jul 88 p 5

[Article by G. Ivanenko, candidate of economic sciences, head of the laboratories for economics and for research and development organization, All-Union Scientific Research Institute for Ferro-Concrete: "Relapses of Obstruction: A Sectorial Scientific Research Institute's Experience in Converting to Cost-Accounting"]

[Text] When VNIIZhelezobetona [All-Union Scientific Research Institute for Ferroconcrete] converted to full cost-accounting, the collective expected a rapid and noticeable increase in labor productivity and increases in the output of administrative, scientific, and engineering cadres. However, this did not happen. I wanted to discover why the new mechanism is spinning its wheels. Naturally, I first centered my attention on the "big three" of cost-accounting: self-recovery [samookupayemost], self-financing, and self-management. Meanwhile, I was not convinced that this model of cost-accounting is exposing the picture of science's work under the new conditions in its entirety. The analysis was fragmentary. Then, four more cost-accounting "selves" were included in the model: self-support [samoobespecheniye], self-reliance [samostoyatel'nost], self-evaluation, and self-defense. After examining how the "system of seven 'selves'" functions, it seems to me, I found the answers to all the questions that had troubled me.

SELF-RECOVERY

This means no subsidies whatsoever, no troughs at all! To avoid bankruptcy, the institute's collective had planned to obtain earnings of 4 million rubles in 1988 by implementing scientific and technical production, having concluded the corresponding number of contracts. This sum provides a profit of 0.4 million rubles, which is divided equally between funds for scientific and technical and social development (FNTSR) and for material incentives (FMP).

The new economic system forced the institute to convert from maintaining laboratories to the goal-oriented financing of specific research and development work. The "expense" part of an estimate for the performance of research and development work must be more strictly formulated. Seemingly, the new work conditions make it impossible to have superfluous expensive equipment or surplus human resources.

Self-recovery presumes the rigorous observance of Article 9 of the Law on the State Enterprise (Association), the five points of which stipulate reimbursement by higher or local authorities for extra-plan work or services. Whereas the direct chief of a main administration is still somehow paying for services performed at his command, for the time being the rayon leadership has been released

from paying institutes for agricultural work and assistance to construction workers. I think that the rayispolkom should pay for such services out of the withholdings which it receives for the local budget, or at the expense of the agroindustrial or construction complex organization. Otherwise, we will never be done with practice of arranging for one's own well-being at the expense of others.

SELF-FINANCING

The collective itself earns all social and production benefits. It finances its own activity, starting with scientific and exploratory work and the technical development of experimental bases and ending with the construction of housing, children's sports centers. Therefore, the economic norms which the ministry approved for the institute for the 12th 5-year period are a key element of self-financing. Let us consider several of these.

For example, withholdings for the ministry's centralized fund are 5 percent of the calculated profit. It turns out that institutes must support not only themselves with their own profits. The ministries themselves determine the size of the withholdings, regardless of their own contribution to the work of a specific scientific research institute or design bureau. With one hand, we vote to de-bureaucratize economic management, and with the other, we generously finance the bureaucratic apparatus. Thus, it is hard to explain: why is only half of the amortization fund which was created left for the institutes? The ministry is taking away half of these funds earned through labor, in order to return some of it later as a "crumb," if "we behave properly." A norm was also set for the institute to pay for basic funds: 1 percent of their cost. If, under conditions of free trade, the institute purchases machines, instruments and equipment and does not lease from the state, the economic sense of paying for one's own funds is generally incomprehensible—this is just like paying a tax to wear a suit purchased in a store.

A few words should also be said about state orders for scientific organizations. The state order, sad though this may be, did not become a competitive source of financing for scientific research institutes and design bureaus, but immediately became a "foisted" command-order with a low level of profitability, up to 25 percent, established by directive from a higher authority. Therefore, today the state order is not beneficial to science. True, at a recent meeting of the CPSU Central Committee with mass information media leaders, M.S. Gorbachev said that a resolution on state orders is being prepared which should correct the distortions which have occurred. This is good. However, one should not forget that the bureaucrats who have become accustomed to paperwork are also preparing to meet with him.

Finally, the entire inflexible system of economic norms orients scientific organizations not towards large, fundamentally new developments, but towards petty projects—the system of cost-accounting which is being introduced is aimed at rapidly obtaining funds for wages, raises and bonuses.

SELF-SUPPORT

Since the start of last year, the institute has converted to supply through wholesale trade. In science, timeliness in the supply of raw materials, instruments and equipment significantly reduces the cycle for creating new equipment. Today, the institute has a unique experimental complex for the determination of the dynamic properties of different construction materials and items at its disposal. However, the collective interprets self-support more broadly: it is also a question of resource conservation. The policy of resource conservation can objectively be strengthened with the introduction of payments for the use of land, water and other benefits of a civilized city, for proximity to the center, convenient transportation systems and a developed infrastructure. It is surprising that, to this day, the gorispolkom has not bestirred itself and established differentiated payments into the local budget by organizations and enterprises.

SELF-RELIANCE

The command-administrative system is still strong and does not want to surrender its positions. Hence, there are many regulations in the economic norm system which deprive scientific organizations of independence. For example, according to cost-accounting logic, the institute itself should dispose of its earned profit. Far from it! The approved ratio between FNTSR and FMP has already been noted. Moreover, it is not enough that a norm was established for the ratio of the earned wage fund (a relatively constant value) to the price of scientific production (an unstable value), which is economically absurd in itself. However, yet another norm is then introduced for the ratio of the material incentives fund to the earned wage (FZP). Thus, the essence of contract prices is emasculated and interest in obtaining the maximal effect from the introduction of scientific research work is undermined, since raising the effectiveness of scientific research work loses economic sense after reaching a certain "ceiling" for the sum of FZP and FMP. Per ruble of wage one can receive no more than the determined sum of bonus, however well and effectively one may have worked. Cost-accounting is turning out truncated.

Supposedly, the institute is independent in terms of its cadre policy, but within the limits of strictly established staff positions. Just try to introduce the position of commercial director, legal consultant on economics or a marketing service at an institute or scientific production association—you will drown in permissions and agreements.

There is yet another paradox: when self-reliance is interpreted abstractly everyone stands up for it, but when it takes on a tangible form, the principles of self-survival begin to take effect and everyone renounces it. Thus, in their time, our laboratory heads rejected intra-institute cost-accounting. For the time being, they decided not to take the risk, not to bear full economic responsibility on their own shoulders. Cost-accounting at the institute became the "top's." The laboratory did not become the master either of its own personnel list or of the resulting savings on the wage fund, and is not participating in the formation of so-called overhead expenses, into which planners can write off all of their "skill" in managing, in maintaining a superfluous administrative-management staff.

The institute has just barely started to work under the new conditions, but the financial authorities have already required that all mandatory payments and withholdings due for the quarter be immediately transferred into the budget before 10 January, out of funds not yet even earned...

SELF-MANAGEMENT

Today, perhaps, this is the most pretentious "self." We have elected a director through an open vote for a 5-year term. The people, so to speak, have chosen their own leader. For the sake of fairness, it should be noted that our director is the main ideologue and "architect" of restructuring at the institute. However, for some reason his deputies are beyond the zone of democratic undertakings. They, like the heads of laboratories, are not elected.

Of course, in speaking of self-management, it is impossible to overlook the labor collective council (STK). How can the rights of the council be implemented under the principle of one-man management, when a certain decision is made by the majority of votes, but the responsibility for the consequences before a higher authority is held by the director personally?

A number of problems have come up with responsibility in general. For example, how should one treat the leader of a scientific subdivision and his collective if it is their fault that planned funds do not arrive in the institute's accounts in time? One must settle the accounts with the budget, higher-ranking agencies and creditors using funds from other laboratories. The responsibility of the institute on the whole, just like a profit for everybody, is egalitarianism.

Self-management is also directly related to intra-institute office work. The picture is paradoxical: we berate the central economic authorities for bureaucracy and the number of unnecessary instructions, yet with our own hands we produce official hitches at the institute through

which planning, registration of contracts, agreement of estimates, work programs and calendar plans must literally force their way. We also work for reports "to the regiment."

SELF-EVALUATION

Under the new work conditions not a single scientific research collective can exist normally without knowing its own real possibilities. How can they be evaluated? Economics basically works using indicators. The economics of sectorial science is no exception. Therefore, in managing according to cost-accounting principles, the institute's economists have developed and applied three basic criteria for evaluating a collective's activity: the profitability of the work, its influence on the effectiveness of the economy of the sector and its ability to compete on the world market.

We have narrowed the ability to compete down into following indicators: the foreign currency income per ruble of outlays for research and development, the number of licenses sold, know-how, and patents which have been received, attributed to outlays for scientific research work.

I would also include the employees' attitude toward restructuring in self-evaluation.

SELF-DEFENSE

Today one of the most serious obstacles that the new economics encounters is departmental willfulness. Allow me to paraphrase a famous quote by V.I. Lenin: one can say that any cost-accounting is worth something only when it knows how to defend itself. It must be admitted that the weakest element of cost-accounting is juridical. Armchair logic has already re-interpreted many of the basic principles of full cost-accounting. The state order has been converted into a command, economic norms—into directives. Has anyone been punished? No one!

Full cost-accounting should become a self-defending system. Meanwhile, such a mechanism has not been created. Therefore, I shall express several considerations.

Firstly, there should be a legislative and real restriction of the rights of different links of management, and administrative and criminal responsibility of officials for not implementing and violating the Law on the State Enterprise (Association). This includes going so far as to exact the sum total of losses, caused by giving incorrect instructions or by establishing economically groundless norms, from the specific guilty parties in court.

Secondly, we should introduce the legislative right of collectives and of individual specialists to independently hold officials, right up to ministers, responsible for illegal actions or criminal inactivity.

Thirdly, it would be expedient to create extra-departmental consultation centers on the theory and practice of cost-accounting, where enterprises and organizations would be able to receive scientifically substantiated recommendations for protecting their own economic interests.

Otherwise, the commands, instructions and orders from the main administrations and ministries will become more important for us than the Law. It will turn out like the fable: "There is no beast stronger than the cat."

What conclusion does this analysis of the "system of seven 'selves'" lead to? It is to be expected that the mechanism of cost-accounting which has been introduced will spin its wheels uselessly. It was structured on the basis of the old, to use a term from mechanics, "kinematic" systems. Only a properly oriented mechanism functions normally.

EDITORS: With the participation of this article's author, the economists at the All-Union Scientific Research Institute for Ferroconcrete have developed methodical recommendations for organizing the work of sectorial institutes under the conditions of full cost-accounting. Scientific organizations which want to become familiar with these methods can send inquiries to the following address: 111524 Moscow, ul. Plekhanova, d. 7, VNIIzhelezobetona. Telephone: 306-34-35.

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Cost Accounting Mechanism for Science
18140342a Moscow *PLANOVOYE KHOZYAYSTVO*
in Russian No 7, Jul 88 (signed to press 23 Jun 88)
pp 65-72

[Article by R. Kozhevnikov, candidate of economic sciences]

[Text] In the last decades, a complex of measures were implemented for changing to the cost accounting (*khodzraschet*) system in the organization of work on the development of new equipment. The main characteristics of cost accounting in the sphere of scientific and technical activities are as follows.

In planning, it became possible to organize work on the development, putting in production and introduction of new equipment on the basis of supply orders. From the positions of the cost accounting principles, it is important that this document, on the one hand, defined the final results, the technical level of the new item and its national economic effect, and, on the other, the necessary resources, sources and amounts of financing and conditions of economic incentives for executors. Supply orders also provided coordination of the fulfillment of jobs at all stages of the development of new equipment,

from scientific research to the introduction of its results into production. They were obligatory for all participants including industrial enterprises where these results will be used.

Experience confirmed a high effectiveness of such organization of work, particularly at the industrial control level under the conditions of overall departmental subordination of the main participants developing a new equipment. In this case, ministries and departments have the necessary planning and organizational means for carrying out a unified technical policy.

At the same time, it might be well to point out the lack of regulation of the economic relations of partners working according to the supply order system. As a rule, the customer, which often is a higher control agency, does not bear the direct economic responsibility for ineffective spending of funds allotted for performing the jobs and for its own mistakes in organizing their fulfillment: changes in the deadlines and in the composition of the executors, corrections in specifications, amounts of financing, etc. On the other hand, the executor does not make cost accounting claims against the customer for his economic losses. This lack of balance in the economic responsibility for the final results violates the initial conditions of real cost accounting relations between the participants of the process of the development of new equipment.

In financing, industrial funds for the development of science and technology were formed. They were used to finance the main measures for the scientific and technical progress, including scientific research, experimental design and technological jobs, reimbursement of expenses connected with setting up the production of new items and use of new technologies, as well as of additional expenses on improvements in the quality of products. The sources of fund formation were the profits of associations, enterprises and organizations the deductions of which were established in percentages of the volume of the industrial production of the industry. Sometimes, considering special characteristics of individual industries, another basis was also used, for example, production costs.

This system of fund formation corresponded to the requirements of cost accounting, since its size and source depended directly on the final economic results of the industry. In this connection, it is also appropriate to mention that the development of new equipment is the determining element of expanded reproduction which must be ensured specifically by the surplus product evaluated at the industry control level by the size of the profit.

However, the above-mentioned insufficient responsibility of industrial control agencies for cost accounting was also evident in the practice of spending these funds. The control over the substantiation of applications by executors for the needs in the financial resources for their

work is usually done by means of selective examination by experts of estimates calculated for individual topics, which is not very effective due to the objective weakness of the normative base in the sphere of NIOKR [scientific research and experimental design work]. There was a tendency to review the cost of jobs, reducing the cost accounting economy left at the disposal of the executor. All this lowered the effect of the stimuli to cut down expenses which were supposed to ensure an economic use of financial, labor and material resources in the sphere of scientific and technical activities.

In the area of economic incentives, it became possible to form independent incentive funds for direct developers of new equipment: in scientific organizations—a fund for economic incentives and a fund of sociocultural measures and housing construction; in associations and at enterprises—additional deductions to the fund of economic incentives. With consideration of the requirements for cost accounting, it was important to coordinate the amounts of deductions to the funds of economic incentives for developers and executors of new equipment with the final economic results from its use in the national economy. This is why the main sources of the formation of incentive funds was the actual economic effect evaluated by the savings from the lowering of the production cost through the introduction of new equipment or an additional profit obtained from the sales of new highly effective products.

This economic mechanism is, generally, progressive, but its practical utilization turned out to be complex and awkward and in some cases conditional.

In the sphere of wages, the variable part of wages increased but the right to it had to be confirmed by specific scientific and technical yield and improvement of the indexes of effectiveness and quality of work. As a result of extensive experimental verification of the experience of enterprises and the organizations of the Leningrad region, in the use of the "Karpov system" in a number of scientific establishments of the city of Moscow and others, a number of measures were implemented for improving the remuneration for work. In accordance with them, the variable part of the wages increases, primarily, by increasing individual increases of the salaries. This kind of cost accounting stimuli of remuneration for work are accomplished, primarily, for designers and technologists whose work makes it possible to use specific criteria of effectiveness, such as the deadlines for the fulfillment of individual orders, technical levels of the adopted engineering solutions, the quality of technical documentation, and others. For scientists, whose effectiveness of work is evaluated by more general criteria, the increase of the variable part of their wages is ensured but the existing expansion of their scales of professional wages. This measure functions simultaneously with the growth of the role of qualification assessments. In accordance with the results of the latter, the worker is not only promoted or demoted in his

position, but his salary can be considerably changed for the same duties, which enhances the effect of the cost accounting stimuli on the yield of scientists.

When the classification of position titles for scientists was limited, their promotion, as a rule, was accompanied by giving them administrative duties, which is not always justifiable. The expansion of the classification of positions made it possible to stimulate their creative work more flexibly.

The cost accounting characteristics of the system for controlling scientific and technical activities basically confirmed that there exist potential possibilities of the development of cost accounting in the sphere of science. However, as has already been mentioned, the realization of these potentialities in the practice of economic guidance was limited by the weak interest of those participating in the development and introduction of new equipment in cost accounting, their insufficient mutual responsibility for the final economic results of their work and the lack of balance between the centralized and decentralized spheres of science management.

The changeover of scientific-research, planning, design and technological organizations to the new principles of management removes these limitations and creates appropriate conditions for the introduction of real cost accounting in scientific and technical activities. The point here is to bring the economic mechanism of science in line with the general concept of the reorganization of the economic management system on the basis of full cost accounting and self-financing, enhancing the role and expanding independence of the main production sector.

In 1988, scientific organizations of the machine-building, metallurgical and fuel and energy complexes, civil aviation, railroad transport, marine fleet and of a number of other sectors of the national economy, a total of about 1,200 institutions, i.e., almost 25 percent of their total number, started operating on the new principles. What are the main changes in their economic activities when they are changed to full cost accounting and self-financing? First of all, scientific organizations in the overall system of economic management are considered as socialist commodity producers being directly responsible for the results of their activities in accordance with the USSR Law on State Enterprises (associations). Thus, they become full and equal participants of commodity-money relations in the process of the development and the introduction of new equipment. This determines a qualitatively new level of the contract as a main document regulating the mutual relations of NII [scientific research institutes] with customers ordering scientific and technical products, including higher management agencies. Firstly, under the new conditions, contracts are concluded for all jobs done by an organization: scientific research, planning, design and technological development, production of experimental specimens, scientific and technical services, etc., including

assignments of ministries and departments. Secondly, the fulfillment of the requirements of the contract is a necessary condition for the acceptance by the customer of the completed job which only then acquires the status of a scientific and technical commodity. Thirdly, contracts determine economic responsibility of both the executor, and the customer for breach of their obligations. The guilty party not only returns the funds they received, but also compensates for economic losses in accordance with the laws in force (pays fines, penalties, forfeits, compensates for loss or profit, etc.).

Thus, it is contracts that ensure the realization of the commodity-money relationship and conditions of cost accounting responsibility of the participants in the process of the development and introduction of new equipment. The new economic and legal function of contracts made it necessary to refine the two kinds of contracts used earlier in scientific and technical activities: for solving scientific and technical problems and for delivering the results of completed tests and development. Unified standard regulations on contracts for the development (delivery) of scientific and technical products were implemented in November 1987.

The results of the contract campaign for conducting jobs in 1988 became the first evaluation of the readiness of scientific organizations for the new conditions of management. They reflected the opinions of customers regarding practical significance of performed jobs when enterprises and associations pay for them with their own funds.

The analysis has shown that, for NII having close relations with industrial enterprises, the stricter requirements for the scientific and technical level of development projects and the effectiveness of their introduction, as well as the stricter substantiation of contract prices for scientific and technical products did not hinder the timely formation of topical plans confirmed by the concluded contracts. For example, in fifty scientific organizations of the Leningrad region, contracts concluded as of the beginning of the current year constituted more than 95 percent of the total volume of their jobs. The contract campaign was practically completed in the organizations of the USSR Minpribor [Ministry of Instrument Making, Automation Equipment and Control Systems], USSR Mintyazhmash [Ministry of Heavy and Transport Machine Building] and USSR Minavtoprom [Ministry of the Automotive Industry].

At the same time, for NII which do not have a considerable number of scientific and technical projects in progress and stable relations with industries and which perform individual assignments of higher management agencies, the contract campaign did not work out too well. In the same Leningrad region, twenty-five organizations had less than one-half of the total volume of jobs confirmed by contracts. A number of scientific teams were compelled to reexamine their topics and exclude small and not very effective topics which did not ensure

profits sufficient for self-financing. For example, in the Central Scientific Research Institute of Ferrous Metallurgy of the USSR Minchermet [Ministry of Ferrous Metallurgy], such topics constituted about 10 percent of the total number of their jobs. By reexamining the topics of scientific organizations of the wood chemistry complex, it was possible to reduce the total number of jobs by 15 percent. In the NPO [Scientific Production Association] "VNIImetmash [All-Union Scientific Research and Planning and Design Institute of the Metallurgical Machine Building]" of the USSR Mintyazhmash, the number of topics was reduced in 1988 in comparison with 1987 from 783 to 375, i.e., to 10/21, by consolidating them.

A stable financial condition of a team of scientists is not only an indication of their successful activities, but also a necessary condition for their scientific, technical and social development, as well as for economic incentives. Therefore, financial factors and stimuli become one of the main directions in the introduction of the cost accounting mechanism in science.

The strategy of the reorganization of the financial policy is defined as a changeover to special-purpose financing of scientific-research and experimental and design jobs according to contracts with customers interested in them instead of supporting organizations by financing them. The realization of this strategy presupposes that the main source for the financing of scientific jobs must be the funds of associations and enterprises. According to the calculations of the ministries and departments, in 1988, 74.2 percent of the total volume of NIOKR [scientific-research and experimental-design jobs] will be financed by such funds in the machine-building complex, 66.7 percent in the fuel and energy complex and 51.4 percent in the metallurgical complex. By 1990, this index must increase substantially and will be respectively 79.1, 70.5 and 60.1 percent.

At the same time, in the USSR Minlegprom [Ministry of Light Industry], it is planned to finance by direct agreements with associations and enterprises less than one-half of scientific-research and experimental-design jobs, and in the wood chemistry and transportation complexes—less than 40 percent. A number of scientific organizations are financed fully from centralized funds of the ministries.

Of course, the ratio of centralized and decentralized sources of NIOKR financing must reflect special characteristics of the production conditions of the industry. For example, some of them are characterized by identical technological processes of many enterprises (well drilling technology, obtaining of individual chemical products, technology of pipeline transportation of oil and gas, etc.), which makes it impossible to decentralize orders for the development of such technologies. Otherwise the unity of the technical policy in the industry will be upset. It is also possible to mention other reasons determining the necessity of the centralization of funds for performing

NIOKR. For example, about 70 percent of centralized funds in the USSR Minrybkhkh [Ministry of the Fish Industry] is spent on the development of predictions of fishing in the World Ocean and inland water reservoirs.

However, in all instances it is necessary to conduct thorough selection of such jobs in order to finance from centralized funds only those NIOKR which, due to objective reasons, cannot be conducted according to direct economic contracts with enterprises and associations. The high share of financing from centralized funds of the ministries narrows the sphere of effect of direct cost accounting stimuli and makes it impossible to use economic methods of management in science to the fullest. This is why central economic departments are instructed to exercise strict control over the expenditures from centralized funds for the development of production, science and technology directed to industries for conducting NIOKR. It is believed that these funds can be used for financing the most important jobs of industry-wide significance, creation of reserves of scientific projects, conducting organizational and economic studies, such as the development of predictions, general schemes of development and arrangement, price formation, etc.

The changeover to new principles of management radically changes the initial conditions of economic stimulation of scientific organizations. Full cost accounting and self-financing presuppose the formation of appropriate funds for providing economic incentives directly from profits obtained from the sale of scientific and technical products. The complex and often subjective mechanism of deducting funds from enterprises and associations introducing new equipment is replaced by normative distribution of the profits of scientific organizations. Thus, profits not only reflect the final economic result of work, but also functions as the main source of scientific, technical and social development and economic incentives for the personnel.

The new role of profit is organically combined with the new procedure of the establishment of prices on scientific and technical products. It is here that are concentrated the most substantial changes in the traditional approaches to the development of a system of cost accounting relations in the sphere of NIOKR. The overall direction of cost accounting in science envisaged that, for settling accounts with customers, formation of incentive funds, determination of the economic results of activities, etc., the initial base was the planned cost of jobs established on the basis of expenditures required for its fulfillment. Therefore, the efforts in the area of the development of cost accounting were oriented for decades toward the substantiation of the estimates of expenditures on conducting NIOKR, for which systems of analogs were developed, a base of labor and cost standards was formed, a complex economic and mathematical apparatus of the processing of statistical information was involved, etc. In spite of the usefulness of

these measures for increasing the overall level of economic operation in scientific organizations, it is evident that their trend is the substantiation of the expenditure mechanism of management with known negative after-effects of its functioning.

The new management mechanism provides for the construction of cost accounting relations under the conditions of the effective contract prices on NIOKR which are based on the effect of the use of the new equipment calculated with consideration of its competition ability, scientific and technical level and the period of its effective use. This effect divided between the customers and the executor is the basis of their mutually advantageous economic relations confirmed by an agreement on the contract price. Of course, the partners always estimate the expenditures on the performance of the jobs and the expected profits. However, it is fundamentally important that these economic categories function as limitation being taken into consideration but are not used as the initial base for the establishment of contract prices.

The new mechanism of price formation encounters great difficulties, which is explained to a great extent by insufficient experience in making management decisions on the basis of real economic effectiveness of new equipment. Moreover, scientific organizations themselves sometimes act in their relations with customers as initiators of the expenditure approach to which they are accustomed in substantiating contract prices on their jobs.

A number of ministries limit the economic independence of scientific organizations in the part of contract prices by establishing profit norms for various types of scientific and technical products. For example, in the USSR Minkhimprom [Ministry of the Chemical Industry], recommendations are approved for the formation of contract prices which have provisions for profit norms with respect to types of jobs. Leading organizations are trying to apply these norms also to outside executors. It is evident that giving up such reversion in favor of free price formation requires time and a longer functioning of the economic methods of control. However, there is no doubt that any reversion to the expenditure principle of price formation on scientific and technical products will undermine the real cost accounting relations in the sphere of NIOKR and will weaken the effect of economic factors and stimuli on the increase of the effectiveness of work of scientific organizations.

The activities of NII under the new conditions of management are directly connected with the developed system of economic norms having in mind not only their substantiation and stability in the course of a planned period, but also the timeliness of their formation. Just the fact that the ministries, having established the necessary economic norms on the basis of the initial data of central economic departments brought them to the

attention of their subordinate organization with a considerable delay (chiefly in December of last year) considerably complicated the conclusion of contracts with interested customers and agreement on contract prices on jobs in connection with the development of science and technology.

As a rule, the norms of pay for the resources and deductions to the state budget are established identically at a level of 1 percent of the cost of the fixed production capital, 300 rubles per one worker and 2 percent of payments to the state budget. This unified approach does not take into consideration the differences in their economic position at the starting period of reorganization. Organizations having a considerable portion of carry-over jobs in the cost of which such deductions are not provided for will hardly ensure timely payments and the formation of sufficient funds for economic incentives. In this connection, a number of organizations raise the question of the postponement of payments for the period of completion of the main part of jobs started earlier.

At the same time, there is a positive experience in solving this problem. For example, the USSR Mintsvetmet [Ministry of Nonferrous Metallurgy] obligated its subordinate enterprises and associations to review contract prices on all jobs which are completed after 1 July 1988 with consideration of the functioning of scientific organizations under the new management conditions, which will undoubtedly accelerate the stabilization of their financial position.

When establishing norms regulating the distribution of deductions from amortization intended for total restoration of the fixed production capital, individual ministries (USSR Mintyazhmash, USSR Mintsvetmet and others) preferred not to leave these funds in organizations but to direct them to the centralized funds for the development of production, science and technology. In spite of the fact that the ministries are planning to return a considerable part of such funds in the form of centralized capital investments, the small portion of amortization deductions left at the disposal of scientific organizations is treated negatively by the working teams as a fact of the infringement of their cost accounting interests.

A number of scientific organizations are justly afraid that the additional wage fund in comparison with that of last year to which they will have the right when the norms for its formation are approved will not be recognized by ministries and banks if there is a considerable increase in the volume of contract jobs, i.e., that this right will not be realized. For example, the USSR Minelektrotekhprom [Ministry of the Electrical Equipment Industry] informed the "Eletrosila" Association regarding the norm for the formation of the wage fund from the volume of jobs of the scientific and research institute with an ar notation that it will be known more accurately after the completion of the formation of their topical

plan for 1988. This confirms once again the acuteness of the problem of the stability of norms and the inadmissibility of correcting economic results which were achieved by increasing the effectiveness of work and which ensure the growth of the earned means.

Preparations for the changeover to the new conditions of management required the implementation of measures for strengthening internal cost accounting. As a rule, these measures provided for the expansion of economic independence of structural subdivisions. The norms and indexes established for the organization were defined concretely for the subdivisions in order to orientate them toward conservation of resources and effective utilization of the funds. A survey of a number of scientific organizations showed the effectiveness of internal cost accounting. At the same time, its strengthening requires further development (particularly in the part of effective utilization of the wage fund) and the realization of the rights of the personnel on a broad differential pay scale depending on the quality and results of their work.

The directions in the improvement of cost accounting relations in the sphere of NIOKR discussed above are in line with the reorganization of the system of economic management of the socioeconomic development of the country. It is this unity that must ensure effective functioning of the cost accounting system of science management. At the same time, the common nature of the economic mechanism does not mean uniform concrete forms of management in various sectors of the national economy. The final product of scientific activities is a commodity of a special kind created under the conditions of individual processes with elements of creativity and indefiniteness, when there is often a long period of time from the beginning of the research to the realization of the results, and some of them can never become sale-and-purchase items. These characteristics must be taken into consideration in forming the cost accounting mechanism in the sphere of science.

In the meantime, the initial experience of work under the new conditions has already revealed the attempts of individual ministries and departments to mechanically transfer the principles of management and evaluation of the work of industrial enterprises to the activities of scientific organizations. For example, it is hardly expedient to require quarterly confirmation of the increment of marketable scientific and technical products for obtaining a wage fund in the department of the USSR Gosbank [State Bank]. For scientific organizations, uniform output of final products every quarter should be considered as an exception, and not a confirmation of the effectiveness of their work. It is necessary to reexamine the conditions of long-term crediting of unfinished production, since limiting credit to one year makes it impossible for scientific organizations with a long NIOKR cycle to stabilize their financial situation in the

absence of their own working capital. It is necessary to find forms of priority in providing the necessary material and technical resources, since the orientation to wholesale trade by analogy with industrial production so far has not justified itself. According to the majority of directors of scientific organizations of Leningrad, the material and technical supply worsened after the changeover to the wholesale trade system.

The solution of many of these problems becomes considerably simpler under the conditions of organizational and economic unity of science and production. This problem is directly connected with the general concepts of cost accounting relations of all participants of the single process of the development of production and the use of new equipment. The traditional system of cost accounting in science was formed at the stage of the development of new equipment, when the producer in the commodity-money relationship was developer of new equipment and its manufacturer was the consumer. All of the above conditions of the strengthening of cost accounting were limited to this stage of the overall innovation process.

However, the present stage of economic development removes such limitations, creating a fundamentally new economic situation for the integration of science and production. One of the most important characteristics of modern scientific and technical revolution is that science turned into a direct production force. This is connected not only with the fact that it became a separate special sector of national production concentrating highly skilled manpower resources with its own material and technical base ensuring experimental improvement of the results of research. The new function of science is determined, first of all, by the level of the development of productive forces, when the quantitative saturation of national production with means and objects of labor has been solved in many respects. Further socioeconomic development is based on the wide-scale production and use of new equipment revolutionizing national production and ensuring progressive structural shifts in the national economy in favor of science-intensive sectors.

The realization of commodity-money relations of the participants of the innovation process in the new economic situation presupposes that a single science-production complex functions as the producer, and the formations of the national economy using new equipment are the consumers. The cost accounting unity of the science-production complex means that science is directly responsible for the final results of its work and for the development of competitive and highly effective products meeting the requirements of the consumer. At the same time, it guarantees the stability of conditions for the activities in science when there are objective difficulties in establishing cost accounting.

It is for this reason that the refinement of the general schemes of management for the sectors of the national economy can be considered the most important measure ensuring the introduction of the new economic mechanism in the sphere of NIOKR and its further improvement. The task is to combine as much as possible all innovation sectors, from applied research to series production and servicing of the produced products, within

production and scientific-production associations, intersectorial scientific and technical complexes, engineering centers and other integrated forms.

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**Talented, Young Scientists Co-opted
into Administrative Career Tracks**
*18140323b Moscow ARGUMENTY I FAKTY
in Russian No 30, 23-29 Jul 88 pp 1, 2*

[Interview by M. Osipovskiy with Academician B. Raushenbakh: "The Work is Important, Not the Report." Passages in boldface as published]

[Text] Academician Boris Viktorovich Raushenbakh, Lenin Prize laureate, is a full member of the International Academy of Astronautics. He has worked in rocket engineering for more than 50 years. Yet at the same time, he has written a number of works on art, recognized by specialists at the Hermitage and the Tretyakov.

On the request of ARGUMENTY I FAKTY, journalist M. Osipovskiy met with Academician B. Raushenbakh.

Correspondent: Boris Viktorovich, what kind of science do we need, in order avoid overlooking a true discovery?

Raushenbakh: This is a very difficult question. In order to avoid overlooking something important, people must be allowed to work. Our science has been structured in such a way that a paper report on the work is important, but the work is not. Such a system is very difficult for talented people, but it is very good for idlers. Our system has been set up in such a way as to alienate the scientist from active work.

A young scientist defends an outstanding dissertation and then what happens to him? His administration, if it realizes that he is talented, tries to help him, naturally. They make him a chief, it does not matter of what, for instance, chief of a group, because this is the only way to raise his wages; he is then alienated to a certain extent from his work and already becomes something of an administrator. Unexpectedly, he does yet another outstanding job. Then the administration appoints him department chief and he already ceases to exist as a scientist. He must go to meetings, assign people to pick potatoes, and do virtually anything whatsoever except scientific work.

Science is supported by prestige, but we have lost this concept. Prestige cannot be measured either by the number of pages written or by an official position. A person might hold some unimportant post, yet still enjoy prestige and be known both here and abroad. Prestige affects neither his wages nor anything else, simply because he does not hold the proper position. This must change. For example, in some countries money is allocated not for a topical theme, but for an idea. If the person has an idea, he will receive funding. If he dies, his collective disbands. The Max Planck Society, I believe, functions in this way.

It is funny when a person attaches to his own documents a list of 600 scientific works. Nobody could have so many scientific works: one could not write that much in an entire lifetime. This is a scientific bureaucrat. He has neither talent nor prestige, but formally he is a "great scientist."

Correspondent: So, all the same, how can you solve the prestige problem? For many years we have been saying that engineering is a good career, and nonetheless the engineer is the classical butt of jokes. If his wage is raised to about 400-500 rubles, will his prestige immediately increase?

Raushenbakh: The wage is already a consequence. Wages must be separated from official duties. In general, one of the methods for stimulating science, in my opinion, is to pay scientists less, not more. As soon as scientists' salaries sharply increased, a tremendous number of idlers and untalented people rushed into science. Yet in America, a person working in industry receives considerably more than one working in science. Those who are interested in science should go into science. This is my, obviously, somewhat strange viewpoint. Reduce wages and nobody except true scientists will remain in science. Incidentally, before the war the position of scientists was extraordinarily bad, yet Soviet science looked good at the world level.

Correspondent: How large is our ballast of scientific cadres, and is planning in science being done properly?

Raushenbakh: Our ballast of scientific cadres is not simply large. It is enormous.

The planning of science works like the planning of pencil production.

One fine day a door opens, the group or department chief's head appears and reports: we must prepare the plan for the future 5-year period. This plan is included in the department plan and then, just as mechanically, in the plan of the institute, ministry, Gosplan, and from there it is released in the form of a state plan, drawn up by the very same scientific worker who had originally proposed it.

What about the department chief, you ask? He sees that the planner has written nonsense, but he knows that this person is a fool by definition and cannot write anything else. One must wait until he retires, but meanwhile let him write nonsense, because it is impossible to expunge a lack of talent. The new certifications for scientific workers are ineffective and are needed only in order to dismiss those who displease the administration. All certifications are essentially nonsense. Let us assume that, if a person works in a certain narrow field, 5-6 people at his institute are capable of evaluating his contribution. The members of a scientific council cannot accurately evaluate whether it is a great step forward or not.

And abroad? There is no formal planning of science. There, a specific problem is advanced. For example, the system that I saw in Oslo: a group of industrial workers solved a Norwegian ship-building problem. A monetary fund was created, to which the government contributed a certain percentage, and the rest came from industrial companies. They invited Norway's best scientists and presented them with the specific problem and allocated, let us say, 100,000 dollars for this. The scientist accounted for the results with only half of the money, and does what he wishes with the rest. Somehow everyone understands that he is not going to build himself a dacha with this money.

I asked what they were going to do with the second half of the money. They answered: for the first year or two we don't do anything with it, but in the third year usually we invest it in the problem on which we are working.

We have no such similar trust in the scientist. If one only accounted for half, the bookkeeper would be shocked.

Correspondent: How does age relate to scientific work?

Raushenbakh: Energy and vigor disappear with age. Therefore, it is particularly necessary to let young people work and to not make young scientists into chiefs. Consider the Nobel Prize winners. They headed laboratories, small collectives of 15-20 people. Kapitsa and Semenov headed institutes. After all, here, if you are not an institute director, no one will take you into consideration.

I think that any interruption of education is destructive, be it the army, sports training, a leave of absence for family reasons—it does not matter. In particular, the training of students studying the precise sciences must not be interrupted. The formation of the brain occurs until age 20 or slightly older. This is a physiological law. Students in the social sciences, strange though it might be, continue to study normally after an interruption. In the scientific study plan, science students are becoming untalented. Excellent directors of institutes, leaders of plants and organizers can come from these. In *LITERATURNAYA GAZETA* I said that we are losing basic science. Yet basic science, as everyone knows, is done by crazy people, boys under the age of 30. I have observed students who have come after the army: they do not have that fantasy, that scientific imagination. They are very organized and disciplined; one may rely upon them. I do not want to say that people are becoming stupid—they are being deprived of the ability to think in a nonstandard fashion. Thus, we are losing our Newtons, our potential geniuses. We are not losing students and rank-and-file scientists, but these executors, not creators.

Correspondent: Boris Viktorovich, after all, if someone is distinguished by the divine spark, by talent, an interruption would not hurt him?

Raushenbakh: It will hinder him. I think that people should be enlisted in the army only after finishing their education.

Correspondent: Do you think that ordinary people see the results of the work to master space?

Raushenbakh: Yes. The main result of space activity for the last 30 years is peace. Let us consider the creation of the space intelligence system. It preserves peace, since one side or the other knows that nothing is being plotted against it. It makes it possible to see everything being created in the territory of another country. It is impossible to build even a dog house without it being recorded. These very important satellites, permitted by international agreement, are not spies: they transmit objective information. They are a national means for observing the compliance with agreements. It would be impossible to conclude even a single international treaty without these space satellites.

Correspondent: Let us suppose that, as Ronald Reagan says, the Strategic Defense Initiative is a purely defensive system. Then perhaps its presence in space is not really so dangerous?

Raushenbakh: First, about bringing weapons into space in general: this must not be permitted. Today, the leaders of one country or another still have an opportunity to think about the question of starting a war or not during the time a rocket flies from continent to continent. If a new weapon, for example a laser, is used in space, only fractions of a second are required for a laser ray to move from the object to its target and to annihilate it. Who can make a decision in so little time? Only a computer. Thus, in the near future the decision about starting a war will be made not by governments, but computers. Yet the fact that a computer can err has been noted more than once.

Now, on the subject of defensive arms. Let us assume, that we have two ideal systems A and B, designed only for defense. It turns out that when two purely defensive systems meet each other in space, they invariably begin to fight. This is the mathematical conclusion.

Correspondent: One last question—you began your work with S. Korolev. Please tell us about your meetings with him.

Raushenbakh: I became acquainted with Korolev on glider flights to the Crimea. I began working with Korolev at the Institute for Jet Research. Then Korolev was arrested and accused of sabotage and the war began. We began to work again from 1954 until his death.

The opinion exists that Korolev was a great scientist and engineer. In my view, he had a remarkable talent as a captain. This is a rare talent. For example, consider the

problem of landing automated equipment on the moon. A problem came up—how to make the chassis, or whatever you want to call it.

Half of the scientists said that the surface of the moon was rock and the chassis should be made like that of an airplane, which lands on concrete. Others said: no, studies of light reflected from the moon indicate that the moon is covered with dust and that if something lands on it it will sink in a few moments. A large inflated bag should be made. They had been talking for an hour, and no one had been able to come to any solution at all. Korolev listened and listened and then said: "So, this means that the soil of the moon is solid." Then one of the "dust" scientists jumped up and shouted: "No serious scientist would ever sign such a statement!" Korolev said: "Would not sign it? Just a minute." He then wrote: "The moon is solid. Korolev."

So, what in fact turned out to be true? It turned out that both factions were right. The moon is solid, but it is covered with a fine layer of dust. This is what Korolev was, a person who could make a decision even with a lack of information.

13362

Turnover of Officials in Academy of Sciences Reported

18140323a Moscow NTR: *PROBLEMY I RESHENIYA* in Russian No 11, 7-20 Jun 88 p 1

[Article by A. Lepikhov: "In the USSR Academy of Sciences Presidium"]

[Text] The USSR Academy of Sciences Presidium meeting, held at the end of last week, discussed the course of fulfillment of the CPSU Central Committee and USSR Council of Ministers decree "On the Procedure for Filling Leading Positions and the Further Improvement of Work With Scientific Cadres in the USSR Academy of Sciences and Academies of Union Republics."

It was noted that in slightly over a year since this decree was passed, 17 directors and 27 deputy directors of scientific institutions and 197 heads of laboratories, sectors, and departments, having reached the age-limit, have left their positions; 82 magazine editors in chief, who have headed the editorial board for more than 10 years, have been released.

Nine members of the USSR Academy of Sciences have been transferred to the position of honorary institute director; 45 people became advisors to the board.

Moreover, USSR Academy of Sciences department secretaries, Academicians N.N. Bogolyubov, M.A. Markov, V.A. Kirillin, A.V. Fokin, N.M. Zhavoronkov and A.A. Bayev, presented their applications for transfer to advisor to the USSR Academy of Sciences Presidium due to age.

The USSR Academy of Sciences Presidium satisfied the request of these outstanding scientists and passed a resolution to hold general meetings in the appropriate departments in order to elect academicians-secretaries for the vacancies which have formed, before June 20 of next year.

At the same time, the USSR Academy of Sciences Presidium has met the requests of Academicians A.P. Aleksandrov, V.A. Ambartsumyan, S.V. Vonsovskiy, A.A. Trofimuk, G.P. Svishchev, B.B. Piotrovskiy, M.A. Styrikovich, V.M. Tuchkevich and N.A. Shilo, concerning their release from the duties of USSR Academy of Sciences Presidium members.

For outstanding scientific service and active scientific organizational activity, the USSR Academy of Sciences Presidium has declared its gratitude to all of the above-listed scientists and has appointed them as advisors to the USSR Academy of Sciences Presidium.

Furthermore, the process of renovating the management cadres of the USSR Academy of Sciences will continue, since 20 directors and 3 deputy directors of academic institutes and 160 subdivision heads are presently holding positions and have reached the age limit.

13362

Funding Problems Prominent at Session of Leningrad Scientific Center Presidium

18140311 Moscow PRAVDA in Russian 27 Jun 88 p 3

[Article by N. Volynskiy under the rubric: "Notes From the USSR Academy of Sciences Presidium On-Site Meeting:" "Ruling, But Not Managing...." Passages in boldface as published]

[Text] Academician G. Marchuk, USSR Academy of Sciences president, said that this meeting was historical. He is probably right. Particularly if one considers that Leningrad has waited for such a meeting for over 50 years. True, several scientists said in the halls that if had not been for academy library fire, the presidium would not have met here for yet another half a century. However, be this as it may, the on-site meeting turned out to be extremely necessary and timely.

The 2 days of work turned out to be very strenuous. Academician I. Glebov, chairman, USSR Academy of Sciences Leningrad Scientific Center, and Academician B. Piotrovskiy, director of the Hermitage, gave reports. Twenty-five people, the leaders of Leningrad scientific institutions and scientists, participated in the sometimes heated and sharp discussion. The range of problems which were considered was so broad that it is simply impossible to list them here.

Today, about half a million people work in Leningrad science on the whole. The Leningrad Scientific Center joins 34 scientific institutions. Of these, 20 institutes are

independent and the rest are departments or so-called "sections" of Moscow establishments. As you see, while this is no army, it is in any case a powerful corps, capable of profound breakthroughs in the basic sciences.

The discoveries or developments by Leningraders, which have achieved a world level and have in many cases exceeded it, were discussed at the presidium meeting. However, many also raised the question: "How do they manage to do all of this?"

It is not a rhetorical question. The Leningrad scientists have extremely limited possibilities for normal work. Their material base is virtually in a shambles. There is an acute shortage of monetary funds.

The Physical and Technical Institute imeni A.F. Ioffe holds a leading position in Soviet and world science. Its original orientations were toward thermonuclear fusion, astrophysics and hard body physics. It has made world-class achievements in semiconductor electronics. Yet, at the same time—it has a most urgent shortage of equipment. Suffice it to say that its inventory of scientific instruments is worth 65 million rubles. This figure is insignificant according to international standards for such an institution. Moreover, a large share of these instruments are hopelessly obsolete.

The USSR Academy of Sciences Scientific and Technical Association is developing and producing first-class instruments, in a greater quantity than the similar organizations of the USSR Academy of Sciences and the Union republic academies put together. It provides the state treasury with an enormous income. Yet, it itself cannot solve a large number of internal problems because of the academy, which takes even that part of the profits which are badly needed for self-development.

The humanities are in an even worse situation. The only building in Leningrad suitable for storing documents is the USSR Academy of Sciences library which, as you know... What, for example, is the USSR Institute of History waiting for? Here 200,000 priceless documents have been collected, but the necessary conditions for storing these invaluable historical treasures have not been created.

In order to understand how this truly dramatic situation formed in Leningrad science, it seems, we must turn to history.

Scientific schools of world significance are not an abstract concept. As a rule, this is the entire city. Scientists have always strived toward each other and have tried to settle in the same area. Göttingen, Heidelberg, Tartu and many other cities are known precisely as cities of science. Thus, gradually and historically, with its own particular features, scientific Petersburg-Leningrad formed, the summit of which was the Academy of Sciences.

Then this splendid tree was transplanted to Moscow in 1934. The operation, painful in itself, had particularly serious effects upon the scientific school which had been created over the centuries. Worst of all, everything is now strictly regulated from the center. All financing goes through the Presidium and the USSR Academy of Sciences system, the list of staff members, i.e., personnel, goes through them as well. Even wages. The USSR Academy of Sciences Presidium determines the number and make-up of archaeological, ethnographic and other expeditions as well as their estimates. The number of sheets in publications, exhibition work—in short, everything is under its power. Leningrad science, like Gulliver, has wound up tied by its hair to hundreds and thousands of pegs of different instructions, agreements.

In 1983 it had become clear that matters should not continue further this way. The USSR Academy of Sciences Leningrad Scientific Center (LNTs) was created. What, however, can it do? Basically, it can "present suggestions" to the very same presidium. Matters are decided over there. The LNTs was, as Ye. Bogoslovskiy, doctor of historical sciences, justifiably wrote in PRAVDA, very rapidly turned into a "bureaucratic organization, which takes away some of institutes' functions because it has nothing to do."

However, one could argue about it having "nothing to do." The main achievement of the LNTs over recent years is thought to be the creation of the "Intensifikatsiya-90" program, on the initiative of the party obkom and under the center's leadership. Its purpose is to balance the development of the Leningrad area in order to eliminate stagnation and to achieve growth rates of 4.5 percent in both production volume and labor productivity, virtually without increasing the number of workers. The figures bear witness: in 1986 labor productivity was raised by 4.6 percent, in 1987—by 4.7 percent. The share of production of the highest category of quality, compared to the beginning of the last 5-year period, has increased by a factor of almost 1.5...

Yes, little figures grow quickly. The more one lists the program's merits and successes, the more one becomes convinced that it is based on a technocratic approach. For example, problems of preserving the surrounding environment remain outside its bounds. Meanwhile, the ecological situation in Leningrad and the oblast has worsened and continues to be aggravated. This, however, is not even the main point. After all, the final goal of developing the economy and industry is to meet the social needs of the people. It is entirely possible to judge the extent to which they are met by the customer lines. So, the problems with lines have not been eased in Leningrad.

In this area—meeting the people's social needs—Leningrad science owes a great deal to society. Particularly those branches of it which can and simply ought to assist agriculture, so that the region can provide itself with the most important food products. After all, what is the

situation now? In the last few years, gigantomania has steadily increased in the development of oblast agriculture. This is not only manifested in the construction of concrete yards for animal livestock complexes, where one cattle-box is sometimes not cheaper than a room in a cooperative apartment. Gigantomania is also displayed in the organization of enormous sovkhoz production associations, in the pursuit of vegetable super-crops. What does this improper choice of strategy lead to? These complexes have become large polluters of rivers and, thus, also of Lake Ladoga. The overcrowding of animals in them leads to the rapid spread of diseases and cattle plague. Almost half of the vegetable super-crops, achieved by re-saturating the soil with mineral fertilizers, do not reach the consumer and rot. For economists, as well as biologists, zoologists, geneticists and scientists of other specialties, the oblast agriculture remains an extensive and currently poorly-used testing ground for their research, which the Leningrad Scientific Center would have been able to coordinate and direct.

However, in this case, the LNTs itself can be likened to a monarch, who rules but does not manage. Meanwhile, Leningrad science, so to speak, is sitting on millions of dollars, pounds and other types of hard currency. Today, it is able in many ways both to provide for itself and to share with its "master"—the academy. Incidentally, it is also able to give the state a large profit. It needs only one thing in order to do this—independence.

Without exaggeration, the speech by R. Itsa, director of a "section" of the Institute of Ethnography, made a startling impression at the Presidium conference. Having related the achievements of his own coworkers and the threatening situation which the priceless collections are in, Rudolf Ferdinandovich declared:

"Foreign currency is badly needed in order to decisively correct our common problems. It is lying at our feet: we have only to bend down. Specialists from almost 50 countries of the world come to us to study at the institute. They are willing to pay us for this. Why do we not take it? Our unique collections are being exhibited in many countries of the world. Again, they are prepared to pay us. Yet again, we are too proud to accept it."

R. Itsa was supported by B. Piotrovskiy, director of the Hermitage, N. Skatov, director of the Pushkin House, and other scientists—physicists and biologists. It would be possible to publish reproduced works by great people, unique books, manuscripts and documents for the international market, and to sell licenses, technology, and instruments. It seemed like a golden radiance had poured out into the great hall of the Academy of Sciences (former, of course). However, once again the same old thing was heard in response. It is possible and impossible. Impossible without the academy officials, who ought to "work through," "clarify" and "settle" all of these ideas. President G. Marchuk's answers inspired hope. However, he left no doubts: comrades, your suggestions are good, but all the same we are master!

Why not look at the whole situation from the other side? Today, in the opinion of a number of authoritative scientists, it is clear that the LNTs has outlived itself as a connecting link between Leningrad scientific institutions and the USSR Academy of Sciences Presidium. A Northwestern Regional Department of the USSR Academy of Sciences should be created in its place—with full organizational and financial possibilities and the right to solve cadre and investment problems.

At the end of the meeting, the USSR Academy of Sciences Presidium passed a promising resolution, aimed at the utmost possible assistance to the scientific institutions of Leningrad. Essentially, it is a broad program for creating new scientific institutions and organizations, the construction of entire complexes and many other things. However, it is long-range—to the year 2000. Is this time period too long? Yes, and moreover, several scientists are expressing doubts that the program will be implemented. All past experience leads one to such a conclusion.

We should make it more possible for Leningrad science to concentrate its own forces, to gather them into a fist. A Northwestern Department of the USSR Academy of Sciences would lift a heavy burden from the "Great" Academy. Our society and state could only profit from this.

13362

**Institute Head on Laboratory Closings,
Inadequate Science Training**
18140306a Baku BAKINSKIY RABOCHIY in Russian
6 May 88 p 2

[Interview by correspondent Z. Mukhina with U. K. Alekperov, corresponding member, AzSSR Academy of Sciences: "Science Requires Work"]

[Text] He is only 40 years old but is already a corresponding member of the republic's Academy of Sciences with a solid record and represents our country as a national coordinator from the USSR and an expert on international scientific programs and organizations. He heads an academic institute and is general director of the republic intersectorial scientific and technical complex "Bioflor." Finally, he is acting vice president of the AzSSR Academy of Sciences, the youngest in the presidium. His path in science is a convincing confirmation of the thought expressed in the title.

Urkhan Kyazimovich! Last fall in Dubna, at the "Science and the Press Under the Conditions of Restructuring" seminar, where I happened to be, a leading scientist from the Joint Institute for Nuclear Research asked the question: "Where is it easiest of all for an idler to survive?" He answered himself: "In science! Because here one can work at a third of one's strength or less and still pass for a scientist." Do you agree with this?

It is impossible to be categorical here, but nevertheless I would say no. As you know, there is a ballast everywhere, including in science, in journalism and in any other area. Moreover, I would say that it would not exist without a ballast. It is simply that the quality of the ballast changes with time. Yesterday's ballast does not resemble today's, that which is the norm today, tomorrow will turn out to be ballast, etc. The more rapid our development and more dynamic the implementation of restructuring, the more intensively the ballast is sifted. The fact that this process is not simple, is another matter. All the same, its dynamics are changing for the better. However, to claim that it is easy to survive in science. No, I do not think so. Science is a special kind of activity. It is too complex for it to be possible to do nothing. Yet, as you know, after all, everything depends on one's own attitude toward that which you choose in life. An idler is an idler anywhere. Science requires work, both physical and mental. It assumes not only excellent professional training in a person, but also the most multi-faceted knowledge, a broad outlook and culture of thinking. And finally, talent, passion, and knowing how to forget about oneself. He who does not know how or does not want to do anything will not attain the eminence in science. Science needs both creators of ideas and conscientious craftsmen. It also needs opponents—skeptics by their own psychological nature, arguments with whom are very useful. I know this from my own experience—I have always had opponents, and this has given rise to the grain of truth.

Today our Academy of Sciences is working intensively in this area. Twenty institutes have been closed, and an even greater number of laboratories, the existence of which offered little. We have converted to a new form of payment: payments are made at the expense of internal reserves. This will also contribute to raising the level of work... Does it look like I am defending the regimental honor?

But why? What, in your opinion, can explain the generally acknowledged phenomenon of "obsolescence" of our science (when the reverse is being observed abroad)? Ever fewer "stars" are revealing themselves while still in school. At times young people even go very unwillingly to graduate school.

This problem is related not to the loss of interest in science itself, but primarily to labor conditions, wages and the social aspirations of young people. Yes, a certain, sometimes significant, share of VUZ graduates due to said reasons go into science without particular enthusiasm. Today, measures are being adopted to increase the wages of young scientists and solve social problems, but their results will not show immediately. Therefore, as a rule, either fanatics or hereditary scientists, who can imagine no other profession for themselves, work in science.

However, today science is an industry. It should not be thought that talented people will appear here of their own accord. It is necessary to create all possible conditions for this.

Beginning with the schools?

Too late! With kindergartens! Yes, don't be surprised. After all, children are very impressionable, their inquisitiveness knows no bounds and their memory is superb. I believe that, in a form accessible to them, it is possible to explain many laws of the development of nature and society. Why shouldn't a child know, for example, why roots grow downward, but a sunflower turns toward the sun? Or what living organisms in nature are "friends" or "enemies" with each other, etc.? After all, these are scientific concepts such as tropism, photosynthesis, symbiosis and others, which they find out about in the school program only in their senior classes!

Today children also need (along with classical) new scientific and artistic works: fairy tales, stories and video films which develop their imagination and thinking, and new games which enable an inquisitive child to obtain diverse information about the surrounding world, natural phenomena and scientific and artistic concepts.

Computers and a large variety of electronic games are needed for this.

Of course. We must not spare resources for games and toys, including contemporary: they are being purchased very rapidly and are invaluable for the development of

children. After all, today's children live in the 21st century! From their very youngest years it is necessary to teach them the work of the mind—to observe, to compare, to think in a nonstandard fashion and to make independent decisions. One should never punish or scold a child if these decisions are incorrect, so that he will not lose his aspiration for independence. Even if these children do not become scientists later, these qualities, taught since childhood, will prove useful for them both in life and in any most difficult profession.

It is very important that these qualities be intensified in school, although this often occurs to the contrary. We cannot wait, while the future talent of a scientist or researcher is being discovered in the school child himself—we must do everything to call it into life and as soon as possible, to help it grow, to foster.

Which means teach them to work! Science is difficult work, not regulated in terms of time and expended efforts, and not everyone is able to work here. Is today's school giving its students a labor basis for this? It is no accident that the February CPSU Central Committee Plenum so sharply raised the problem of labor upbringing, which for the time being is still completely formal in nature.

In my opinion, we do not need labor lessons, but real and appropriately paid labor. The latter, incidentally, evoked objections from several teachers with whom I happened to talk on this subject. Adults are frightened by money in the hands of schoolchildren, but after all in their future life they won't be using the barter system! There is nothing wrong with schoolchildren knowing the value of an earned ruble, and learning to sensibly spend that which they earn themselves. Then, they will even look at the family budget with entirely different eyes...

One of the possible ways here are regular joint work days with their parents. For a start, let your child work along with you, even if only once a week. Unusual? It is nothing terrible! Parents will not let children be overburdened, but will not let them goof off, either. He who goes against his conscience or "spares" his child is simply doing his own child out of its fair share, depriving him of the happiness of working seriously and genuinely.

Urkhan Kyazimovich, what is the republic Academy of Sciences doing to attract talented youth, to seek them out and educate them?

I would say that in this area nothing, even the largest work, can be considered adequate. The academy is doing a great deal, particularly in recent years, and is working not only with student youth. Meetings of scientists with students in schools and scientific institutions are regularly organized and contests and olympiads are held. Of course, the level of this work must be raised in order to improve its form. Creative incentives and a belief in involvement in serious work are needed. For example, at a meeting in the United States space center the American

astronaut S. Barton discussed the participation of schoolchildren in a contest for scientific projects, intended to be done on board a piloted spacecraft. The significance lies not only in the fact that the project winners were included in the NASA program. What is important was the mass involvement of schoolchildren in a creative process.

However, the academy cannot cope with such a task alone. After all, in order to raise the level of science, it is not enough to go through the schools and discover talented people. A clear system and a developed industry for training cadres are needed. This was also stated by the CPSU Central Committee February Plenum. The educational system requires renovation in everything, it requires different, higher criteria and reading points, the overcoming of numbness and stagnation. Otherwise we will stand in place. However, the main task remains the same: to educate healthy people who know how to work.

I know that you yourself profess precisely such a principle in your own life. You worked even when you were in school.

I studied and worked and I don't see anything special about this. In the day I studied, at night I worked—both the second and third shifts. At first my work was unrelated to my future specialty, but in my third year I began to teach biology and chemistry at night school—I drove to a plant, where they had started courses for those for whom 7-year education had not been mandatory then, in the early 1960s. I taught others and I taught myself—to work. I do not protect my own children from this.

Urkhan Kyazimovich, what in your opinion, is most opposed to science?

Bureaucracy! It arises from a feeling of fear: fear of responsibility, of the possibility of losing one's "chair," of not knowing how to make the right decisions. If the bureaucratic system becomes all-embracing, science will cease to develop.

It should be noted that today many normative acts which appeared as a consequence of the customary bureaucratic work methods are being abolished. However, the process is occurring slowly. Consider, for example, one of our republic MNTKs, "Bioflor," created to determine scientific and practical ways to produce hard currency-intensive goods. What about it? The form itself is new, but many normative acts are old. Because of this, once again work is spinning its wheels and not providing the desired results. In other words, the longer the life of bureaucracy, the shorter and more insipid the life of science.

Yet, after all, science is not simply a branch of knowledge! Allow me to quote the French biologist Pierre Theillard de Chardin, from his most interesting book "The Phenomenon of Man": "From the time of its birth, science has

developed, inducing primarily a need to solve some problem or another of life. Thanks to this, man, undoubtedly, is heading in the direction of conquering matter, put into the service of the spirit. Greater might, in order to act more. However, in the final account and in particular: act more, in order to exist more fully."

Splendid words. A splendid goal! This is a goal worth serving. For its sake, it is worth working.

13362

Professor Decries Technological Lag of Soviet Students, Lack of Computer Experience

18140306b Baku BAKINSKIY RABOCHIY in Russian
11 May 88 p 3

[Article by V. Akhmedov, department head, Azerbaijan State University imeni S.M. Kirov, doctor of chemical sciences, professor: "Restructuring in Education: Problems Need Solutions." Passages in boldface as published]

[Text] Last year Vagif Melikovich Akhmedov, department head, Azerbaijan State University (AGU) imeni S.M. Kirov, doctor of chemical sciences, took a long scientific sabbatical at Kansas University, where he carried out research work and gave a series of lectures on the use of metal vapors in chemical processes. Interest was shown in the works of the Azerbaijan scientist in a number of other scientific centers in the United States—universities in Los Angeles, San Francisco, New York, Chicago, Houston and other cities, where V. Akhmedov also lectured.

Today he shares his thoughts on the problems of VUZ science and the training of skilled cadres in higher educational institutions.

Recently, a letter was published in one of the central newspapers which seemed in keeping with my own thoughts. It included, in particular, the following lines: "Great damage is being done to higher education by underestimating the role of VUZ science directly in the educational process. Systematic scientific work should be based on the teacher's professional competence. However, whereas the failure of one lecture is seen as an extraordinary occurrence with all the ensuing consequences, scientific passivity, which has gone on for decades, does not seem to be bothering anyone."

Very true, in my opinion. At the February CPSU Central Committee Plenum the universal question was raised of the radical renovation of national education. It is entirely obvious that without the proper development of VUZ science there is not and cannot be full training of specialists. The creation of a unified system of national education would make it possible to eliminate departmental barriers and to ensure the qualitative renovation both of the educational process, as well as of scientific activities in VUZs.

What do VUZs need today to restructure their work? Above all—the cardinal technical re-equipment of the educational process with the diverse use of modern computer equipment. It is difficult to overcome the problems here. On the one hand, our industry is still unable to provide a sufficient quantity of good small-sized computers. On the other—computer literacy in all links of the educational process for the time being is at a very low level. The "computer awareness," if it can be put it that way, of the personnel of educational institutions is at the rudimentary stage. The computer course held 2 years ago, which was mandatory for all professorial and teaching staffs at VUZs, was formal in nature and did little to help anyone overcome the "fear" of new equipment. In this regard, our specialists are far behind their foreign colleagues.

My recent scientific sabbatical at a number of U.S. universities showed that both educational and scientific problems are being solved there using the most modern equipment, particularly computers. In American universities the high computer literacy of both teachers and students draws attention to itself. The same can also be observed in American enterprises and establishments of any category.

We are still far from this. In order to eliminate this gap it would be expedient to open special schools, analogous to foreign ones, for training young people in the basics of computer technology.

Let me cite yet another instructive foreign experience. At universities in Italy, England and the United States they practice the long-term work of scientists from other countries. As a rule, these scientists arrive with a certain scientific idea and solve it using the universities' excellent equipment, which significantly accelerates the implementation of the idea. Many of them remain at these universities for a long time in order to continue their scientific research.

Naturally, above all, the science of those countries which these scientists visit benefits from this, and in time acquire talented scientific cadres. For example, I shall cite the following figures: in the Kansas University 1986-87 school year at the chemistry department out of 18 projects on large scientific problems, 16 were done by scientists of other countries. We utilize this form of contact very little, mainly because of insufficient technical equipment. Further democratization of our society, and also of science, will help to solve this important problem.

The system of training according to contracts with enterprises at the latter's expense is of great significance in radically improving the quality of cadre training. Such an approach makes it possible, on the one hand, to differentiate the specializations of different cadres with a view to the needs of different sectors of the national economy and to eliminate existing disproportions in cadre training, and on the other—it contributes to

strengthening practical and creative ties between educational institutions and industry. This process is already beginning, and against its background, the professors and teachers of VUZs are becoming noticeably more active.

Considerable damage was done to cadre training by the existing limitation of work by leading specialists of the national economy in VUZs, in terms of holding more than one job. Recognized scientists and specialists of the republic, working in scientific research institutes and sectorial enterprises, have remained uninvolved in important tasks such as cadre training. Due to the shortage of fresh ideas and views in this area, a spirit of conservatism began to take root. Many poor teachers appeared in VUZs, who had found work by accident. Outdated both in the pedagogical, as well as in the scientific sense, they have strengthened the separation of higher schools from industry and science even more. The systematic strict certification of VUZs should free students of such "tutors."

Having worked more than 20 years in a scientific research institute, the party's plans for restructuring the scientific activity of VUZs are particularly dear to my heart. Further development of this area entails intensifying the integration of education with industry. The decisive breaking of everything that hinders the development of VUZ science is needed.

One of the main obstacles in this path is the isolation of VUZ scientific activity. Frequently many scientific studies in VUZs are carried out in primitive, technically ill-equipped educational laboratories. The main result of these "studies" are student diploma work and dissertations by illiterate scientists, needed by no one. It is no secret that these good-for-nothing scientists, having completed their work, keep the results under lock and key and ply the entire country in search of a "suitable council" for issuing diplomas, offering the possibility of obtaining the cherished positions of docent and professor and, along with this, a guaranteed salary.

In order to eliminate the isolation of VUZ science, we must find a way for educational institutions to interact more closely with scientific establishments and production organizations. The network of "VUZ-SRI-industry"

joint scientific research groups requires considerable expansion. Unfortunately, such "unions" are being created slowly. The problems with creating department branches in the republic's scientific research centers are also being solved slowly. Initiative in this important matter, as a rule, belongs to leading VUZs, but the republic Academy of Sciences and production associations all the same are not displaying proper interest.

Studies carried out in departments through direct contracts based on the cost-accounting principle, particularly under conditions of the conversion of enterprises to self-financing, remains an important factor in the science-industry activity of VUZ workers. In other words, when an enterprise starts actually counting its own earned rubles, it will begin to finance only those problems without a solution for which it cannot ensure the development of its own production. Consequently, only those VUZ departments capable of implementing a real scientific solution to the problem under consideration will receive orders.

For the cardinal restructuring of VUZ science, we must create normal conditions for expanding basic research for the departments. Here the organization of independent scientific laboratories takes first priority, which would be unrelated to the performance of educational and methodological work. Until recently, at the chemistry department of AGU imeni S.M. Kirov, only one problem laboratory was operating. Today, two more have been created. There should be one in every department. This would make it possible to involve the most talented students in serious scientific work and will provide them with the opportunity to work in these laboratories after completing their studies (according to well-known data, in the U.S. the sharp decrease in age in science occurs precisely because of gifted students). Thus, these laboratories will become a base for future VUZ pedagogical cadres as well.

However, it should be emphasized again that the effectiveness of scientific output from laboratory activity under the departments can be felt only if VUZs are technically equipped with the necessary experimental and research instruments.

U.S. Approach to S&T Security Issues Outlined

18140030b NTR: PROBLEMY I RESHENIYA
in Russian No 17 6-19 Sep 88 p 4

[Article by K. Petrov: "The American Approach: The Best Way to Remain a Leader—Run Faster than the Competitors"]

[Text] An analysis of the evolution of secrecy in the U.S. (up to 20 percent of research and development costs go to protecting information) shows a steady tendency towards more extensive state control over scientific and technical achievements.

However, there are often divergences between scientists' and U.S. Government officials' opinions on secrecy, and its influence upon scientific and technical progress. Military circles, trying to classify as much information on basic and applied research as possible, are especially rigid on questions of secrecy. Their main argument is the possibility of strengthening Soviet science through the achievements of scientists in the United States.

Scientists argue in the following fashion. In order to retain a technological lead it is necessary to clearly know the source of scientific and technical achievements. They hold that this source, or more precisely, intellectual basis, is university laboratories and large industrial research centers, which embody the new ideas obtained by science. Their main distinguishing feature is the promotion of scientific and technical progress through the unlimited exchange of ideas with colleagues and through the publication of research results. There can be some deviations from this ideal of full openness only where university scientists are working with government organizations. However, in no case can basic research results be hidden under a basket. They should be freely published.

Scientists in the U.S. firmly believe in the advantages of "security through achievements" compared to "security through concealment." They assert that traditional methods of protecting state property—fences, safes, armed guards, personal inspections, are completely unsuited to protecting the "main wealth" of the United States, the "ability to invent new things."

In the opinion of American specialists, America is not so strong in turning scientific knowledge into finished products. Here it lags behind the more entrepreneurial Japanese, even though it is considerably ahead in basic research. Scientists are particularly disturbed that the "technically illiterate hard line policies of the Reagan Administration view the solution to the problem of retaining American leadership in technology in terms of high fences and thick shutters, while people who understand the essentials of scientific and technical progress know that the best way of remaining among the leaders is to run faster than the competitors." Finally, the most

important argument is that it "is much better to be in a position where one is robbed than to get into a situation where you have to take from others."

A quite sensible approach to the secrecy problem has now been formulated in the United States. Its characteristic feature is the understanding that science needs restrictions because of international conflicts. As a rule, however, science should develop in a spirit of open competition, as secrecy is alien to its nature. Therefore, scientific information should generally not be classified. Science deals only with the "nature's secrets." This is the main difference between science and technology. There are "people's secrets" in technology. It is thus useful, and sometimes necessary to classify them.

The government's position markedly shifted towards the scientists' position after the February 1987 publication of the U. S. National Academy of Sciences report that the Department of Defense veto on the export of strategic items did not strengthen national security, but costs the U. S. economy 9 billion dollars annually.

Indicative in this regard is President Reagan's 17 February 1987 speech on initiatives to improve the competitiveness of the United States: "America's most important advantage has always been our scientific and technical creativity. In many respects we have invented the modern world. Our legislative measures helps make a shorter and surer path from American laboratories to American enterprises and the world market. Among other things, our attention will be focused on federal laboratories for defense needs. These include the world's largest and most productive scientific centers. In the past there were barriers separating what was taking place inside and what was going on in the commercial world. This situation will change. We will give incentives to scientists working in federal laboratories to apply for patents and licenses and to commercialize their research. Federal laboratories are planning to give discoverers' honoraria to their scientists. We will attract entrepreneurs working in science to act as a link between laboratories and the business world, between capitalists and universities. We will also provide incentives for exchanging information between federal laboratories and private industry so that they can gain something from one another. We will also provide incentives for transferring defense and space program technology to industry and to see that this takes place faster than it now does."

11574

**Reforms Fail to Improve
Publication of S&T Literature**

18140319a Moscow NTR: PROBLEMY I RESHENIYA
in Russian No 11, 7-20 Jun 88 pp 7-8

[Article by M. Gelman, candidate of technical sciences: "Missing the Goal." Passages in boldface and italics as published]

[Text] The USSR Goskomizdat collegium resolution, published last December, "On the Further Democratization of Organizational and Creative Activity of Publishing

Houses" is not leading to a significant improvement in this activity, at least not when it is a matter of publishing scientific and technical literature—this is the opinion of the author of this article, M. Gelman, candidate of technical sciences. We are offering a somewhat discussion-oriented article for your attention and hope to learn the opinions of our readers—managers and workers at scientific and technical publishing houses, Goskomizdat, the book trade, and of authors of popular scientific and specialized books.

Does scientific and technical literature, the organization of its production and distribution conform to the needs of the times? I do not think so.

The USSR Goskomizdat collegium's resolution entirely justifiably noted the lack of glasnost and the bureaucratism, impracticality and many other shortcomings in publishing. However, the ways suggested in the resolution for eliminating these shortcomings will not, in my opinion, lead to a significant improvement, at least not in the publication of scientific and technical literature.

The main reason for the dissatisfactory situation in the publishing sector has thus remained unchanged. The basic aspect of book publishing has remained the same as that of a "sector of industry, of the economy," stated by M.F. Nenashev, Goskomizdat chairman, in 1986 (IZVESTIYA, 16 Aug 86). Such a viewpoint also engenders a corresponding approach to the publication of literature in general and of scientific and technical books in particular, which are treated as a commodity, the final product of a department. In this regard, the system of gross indicators, including the amount of off-print lists (the number of items), the sizes of deliveries, the performance of printing production (in rubles), and the profit from the sale of literature orients the country's scientific and technical publishing houses towards the output precisely of books, and not the information, which specialists need, in these books. The replacement of the goal by the means, of the significance of the information by the significance of its carrier, the book, is plainly obvious. This has led to the appearance and flourishing in some publishing houses of administrative workers, incompetent in specific fields of science and technology, who "rubber-stamp" books according to planned indicators and are incapable of objectively evaluating the books' content, degree of importance, informativeness, newness, scientific and technical level, practicality, etc. These factors, as well as the anonymity, permitted until this year, and irresponsibility of reviewers and the lack of discussions, criticism and democracy have provoked manifestations of illegality and immorality in publishing houses, have frequently contributed to the rise of groups and monopoly on the exclusive nature of the opinions of individual people, and have led to secrecy, formalism, bias and, consequently, to subjectivism in the consideration of works.

Subjectivism is most often manifested in the consideration of works on new achievements in science and technology and progressive experience, which may not

conform to the concepts of publishing workers, editorial council members and reviewers. However, subjectivism and incompetence are not only manifested in the incorrect evaluations of good and needed books, but also in the publication of numerous works which do not enjoy demand.

How are the gross indicators met? The fact is that approximately 2-3 thousand copies of each publication are purchased by libraries. Therefore, the publishing houses, in order to guarantee the sale of their own production, strive to produce more small-circulation books, the size of which does not exceed 6-8 printer's sheets.

The existing criteria for the work of publishers have also led to the appearance of editorial boards which publish works on a broad range of topics. While the interests of such editorial boards of various publishing houses frequently intersect, the subject matter is coordinated formally. This, in turn, has led to the creation of "universal" editorial councils, in which the number of specialists in a specific field of science and technology often does not exceed two or three people, creating only an illusion of the broad discussion of works.

It should also be noted that the staffs of individual editorial councils remain essentially unchanged for about 10-15 years, which also creates good soil for cliquishness and the touching unity between council members and the leaders of publishing houses (considering that the latter also select the council staffs).

Under these conditions, in practice authors are deprived of an opportunity to defend themselves from manifestations of subjectivism and administrative and formal bureaucratic relations, as well as a chance to prove the correctness of their own opinions to anyone.

Publishers annually reject about half of the authors' proposals and manuscripts. A reviewer, usually an authoritative figure at a publishing house, could be honestly mistaken, but as a rule, his opinion, despite a corresponding normative USSR Goskomizdat document, is adopted as the official stance of the publishing house. Decisions on the unsuitability of works are virtually not subject to appeal and are made by one person—the publishing house director, formally, wholly and completely based on the opinion of one or two reviewers, often "trusted" people. The editorial councils are advisory bodies, as a rule. They do not meet with the authors to discuss their manuscripts. The heads of the editorial boards, who have been instructed creatively and actively to participate in forming an objective opinion on the manuscripts, are basically busy with the formal correspondence between reviewers and authors. Under these conditions, often neither the publishing house nor the reviewers even consider it necessary to argue their opinions on one or another work and basically do not respond to the authors' objections.

There is no need to state that many of these decisions are incompetent. In nuclear power and protection from ionizing radiation, at least, this incompetence was graphically displayed during the Chernobyl tragedy.

A famous doctor, Professor A.K. Guskova, had asked Energoatomizdat to publish "*Manual for the Organization of Medical Assistance During Radiation Accidents*" in 1983. The publishing house director rejected this proposal. It should be noted that part of this work also concerns the subject matter of another publishing house, Meditsina. The author and the department leadership turned to USSR Goskomizdat, which also did not help. Then (by sad coincidence, this occurred about a month before the Chernobyl accident) A.K. Guskova turned to the CPSU Central Committee with substantiation of the urgent need for the rapid publication of "*Manual...*" After the accident, USSR Minzdrav was forced to rapidly duplicate the manuscript manual in the form of xeroxed copies, but in a miniscule quantity: 500 copies in all. Professor A.K. Guskova's proposal was accepted by the Meditsina publishers only after interference by a higher party authority. However, to this day the book has not been included in its publication plans and from time to time they return it to the author under various pretexts of making individual corrections. However, the employees at Goskomizdat and its Main Editorial Board for Scientific and Technical Literature, headed by V.V. Yezhkov, are acting as outside observers.

Specialists have been waiting almost 7 (!) years for another work by Professor A.K. Guskova, "*Manual for the Organization of Medical Service for Persons Exposed to Ionizing Radiation*." Until 1984, the two publishers—Meditsina and Energoatomizdat—repeatedly sent each other the manuscript of the manual, claiming that the work supposedly did not conform to their subject matter. The book was finally published by Energoatomizdat in 1985, but in an edition of only 4,500 copies. A tragedy had to occur, before an additional edition of the manual was hastily printed in 1986.

The lack of the necessary literature has played a negative role in the Chernobyl event. This is stated quite definitively in the notes of Academician V.A. Legasov (see PRAVDA, 20 May 88).

Yet another example. At the end-of-the-year book fair in Moscow the West German publishers "Springer" signed a contract with the VAAP to publish books by G.N. Belozerskiy, doctor of physical and mathematical sciences, professor at Leningrad University, on the Messbauer effect and its applications. The work was supposedly accepted for publication by Energoatomizdat in 1983, but in 1985 the publishing house director rejected the work on the basis of only one reviewer's opinion. In this connection, ten other positive reviews and opinions, as well as the opinion of the chief editor of the publishing house, were ignored. Thus, this book not will be published in the land where the effect was discovered, but in the FRG. And what do we have? For the time being the

question has not been definitively solved. For several years the author has tried to achieve the open discussion of his work. However, as in other similar situations, all appeals to other authorities, including to the CPSU Central Committee, were returned to one and the same person: V.V. Yezhkov, chief of the Main Editorial Board of USSR Goskomizdat, whose opinion is the last word for all of the authors of scientific and technical literature. Yet, after all, neither he nor many other employees of the main editorial board, not being specialists in many specific fields of science and technology, are able to act either as idealogues of book-publishing or as arbitrators in disputes between publishers and authors, since they are unable to thoroughly examine the essence of many works.

Glasnost and democracy should become the norm for our life. However, one gets the impression that the former anonymity of reviewers and the secrecy of discussion of manuscripts was beneficial to someone. After all, under such conditions it is very convenient to get rid of unwelcome authors, defaming their works and, at the same time, the authors themselves.

Unfortunately, the introduction of democratic foundations in the interrelations of authors with publishers is only declared in the above-mentioned USSR Goskomizdat collegium resolution. As before, authors remain defenseless in the face of possible arbitrariness on the part of the publisher, who only needs to receive two negative reviews (which, given a desire, is very easy to do) in order to get rid of an unwelcome author. Who can distinguish a reviewer's ill intentions from an honest mistake?

Negative factors in the organization and practice of book publishing are also being intensified by purely commercial departmental interests.

It is impossible to turn good and necessary work into a campaign, subordinating the interests of the matter to a single system. The final effect of the information being published cannot be evaluated as the profit gained from the sale of its carrier. For precisely this reason, cost-accounting and self-support in those forms useful to industrial enterprises cannot be disseminated on the whole, as is now being done, in scientific and technical publishing. Under these conditions, profit from the sale of books becomes a goal in itself. Today, if Einstein or Kurchatov had offered our publishing houses their own unknown works, the risk of bankruptcy under the new economic management conditions would hardly have enabled the publishers to publish them. Thus, nobody and nothing objectively encourages this. Rather, the reverse is true.

Proceeding from the need to obtain a departmental profit, the Goskomizdat leadership is proclaiming the principle of reducing the number of titles of books and is instructing scientific and technical publishing houses to produce "popular" literature, including fiction (!). Thus,

Energoatomizdat, on assignment from Goskomizdat has produced several volumes of a children's library of adventures and the books *"The ABCs of Knitting"* and *"Rare Vanishing Animals."* Meanwhile, the production of books unrelated to the publishers' subject areas is being implemented without allocating additional limits for paper and a polygraphic base, as a result of which the number of scientific and technical publications is being reduced.

Cost-accounting and self-financing, currently introduced formally in book publishing, lead to the fact that scientific and technical publishing houses will strive toward the even greater production of fiction and will refuse to have anything whatsoever to do with the publication of the latest achievements of science and technology, if the circulations of these publications are not profitable. What kind of scientific and technical revolution, what kind of acceleration of scientific and technical progress can we talk about, given such principles for providing information for the country's national economy?

The answer to this situation lies in organizing the publication of scientific and technical literature within the framework of a single state-wide system for scientific and technical information.

Scientific and technical publishing houses are related to non-industrial enterprises. Therefore, the criteria for their activity should be not be aimed at obtaining a profit from the sale of literature, but at the final effect achieved from its propaganda and utilization, i.e., the materialization of scientific and technical knowledge and the latest achievements of science and technology and progressive experience in the use and application of production facilities.

In order to do this, a system should be developed for evaluating the activities of scientific and technical publishing houses under contemporary conditions. It seems that self-support alone, and not even full, should be the necessary and adequate criteria for the economic activity of scientific and technical publishing houses. In this regard, some of the outlays for publishing scientific and technical literature should be covered at the expense of the industrial ministries and departments which are consumers of the information contained in this literature. One must pay for information, as well as for raw materials and energy. Information is also a commodity.

Moreover, criteria for the evaluation of publishing house activities should objectively contribute to the appearance of publications on the latest problems of science and technology, the solution of which contributes to the intensification of the country's socioeconomic development. In order to do this, the plans of publishing houses should also be oriented toward plans for creating and mastering new equipment and new technologies by ministries and departments. In this respect, book-writing can

be planned by the corresponding enterprises, the developers of this equipment, in the form of state or departmental orders. This same form should also be used in published these books.

Outside financing of some of the publications "liberates" the publishers and enables them to risk publishing information on the latest achievements of science and technology.

In order to orient authors towards writing books needed by the country's specialists, it would be expedient to systematically organize all-union contests for writers in the most important areas of science and technology with the first-priority right to printing for the winning works. Scientific and technical societies should also participate in organizing such contests.

Publishing houses should be involved in the active propaganda and dissemination of scientific and technical knowledge and achievements, actively influence the minds and thinking of specialists, and carry out an intensive search for new works to publish.

To some extent, the elimination of anonymous reviewing, permitted until recently, will promote a reduction in subjectivism and administration in the consideration of manuscripts. However, this will occur only given the introduction of reviewers' responsibility for their judgments and the elimination of secrecy in the discussion of works without their authors' participation. In order to do this, particularly in editorial councils, it would be expedient to organize seminars—meetings of specialists, accessible to anyone who wishes, with the mandatory participation of the reviewers. Decisions on manuscripts should be made by the collegium at editorial council meetings, with the participation of publishing house leaders.

The heads of editorial boards and the chief editors of publishing houses should be leading specialists and should be allowed to hold more than one job. It seems expedient to periodically (about once every 3 years) hold contests to fill these positions, which should be scientific. The replacement of book-publishing officials by specialists will also contribute to a reduction in formalism and subjectivism in the relations of publishing houses with authors.

The personnel of editorial councils must periodically (about once every 3 years) be replaced by no fewer than half. Candidates for these councils should be nominated by scientific research institutes, design bureaus and industrial enterprises for no more than one term, and should be discussed at authors' meetings at the publishing houses.

In order to reduce the risk of definitively rejecting a needed book which received a negative review, it would be expedient to organize the centralized (in publishing houses) deposition of manuscripts, and to publish the

authors' references and corresponding reviews and opinions in a periodical special critical-bibliographical bulletin (according to sectors). The readers' opinions will make it possible to make a more objective decision about the deposited manuscripts. In order to meet reader demand and economize on paper, two- or three-time publication of books should be organized. The first, test printings should be published in a minimal circulation in order to familiarize specialists with them, and subsequent printings should be based on paid subscriptions.

In order to coordinate the activities of authors and defend their interests, it seems appropriate to create an all-union creative union for writers of scientific and technical literature, similar to the USSR Union of Writers.

It is easier for Goskomizdat to manage large universal publishing houses, but it is impossible to select encyclopaedists to lead them. Therefore, it would be expedient to break publishing houses up into smaller units, orienting them towards relatively narrow fields of science and technology. These publishing houses, converted into the corresponding main editorial boards, the councils and leaders of which would also make decisions to publish books, could obviously be combined into an all-union publishing production association, including a polygraphic base and subordinating typographic interests to the publication of information, not to the output of paper products. Such an association would have a single administrative and economic management agency, which would allow it to reduce the number of management personnel.

This is hardly a complete list of measures, the implementation of which would probably ensure a comprehensive approach to the publication of scientific and technical literature under contemporary conditions within the framework of a single state system for scientific and technical information, guided by the GKNT. Obviously, scientific and technical publishing houses should be subordinate to this committee.

In conclusion, it should be emphasized that publishing houses and authors are forming informal unified collectives. Over the recent "stagnant" years, many of these turned into closed societies which have monopolized book publishing in individual areas of science and technology. Without democratizing their activities, the real, rather than the stated, book publishing industry is preserving the effects of previous years.

13362

**Scientist Sees Little Improvement
Despite Lifting of S&T Publication Rules**

18140030c NTR: PROBLEMY I RESHENIYA
in Russian No 17, 6-19 Sep 88 p 4

[Article by V. Krichagin, senior scientific associate, VNI [All-Union Scientific Research Institute] for Medical Information, USSR Ministry of Health: "A Deliberately Incorrect Solution"]

[Text] In a recent issue NTR reported about a laxening of controls by Glavlit, Main Administration for Safeguarding State Secrets in the Press. However, I don't see any

reasons for special joy. It is proposed to replace a lengthy expert review by a short one and instead of many there will be only one signature and one seal. Is this fundamental progress? Hardly. Rather, it is a repetition of chronic mistakes.

The expert review system was and remains structured around the fundamentally inaccurate concept that does not prevent the leakage of valuable information, but damages the primary level of scientific progress—the ripening of new ideas, where an open exchange of information solves everything.

The essence of the problem of protecting state and production information essentially is that an idea worth protecting and hiding usually springs up during the exchange of data. There should be one goal to this—realizing the information as intellectual property. If there is no such realization, then it makes no sense at all to hide an idea. It whirls into the air and inevitably appears in a new place. Those who classified the idea but did not use it are made the fools.

Such an expert review system is based upon the mistaken impression that one can create a network of "overseers" (chiefs, commissions, experts, etc), which, having a bird's eye view of the ripening of ideas, will take only mature ones and quickly hide them. As an agency not responsible for the realization of hidden ideas, this network will always try to hide more "for reserve." This is like lowering the control rods of a nuclear reactor, reducing the creative temperature and stopping a valuable reaction for scientific progress at its main stage, the birth of ideas.

The main person interested in the timely use of methods and means for protecting intellectual property should be its creator. Chiefs, experts and consultants might come in handy, but only to help and not to command. It is in science that the command-administrative system has caused the greatest damage to the economy. Like any type of creativity, science cannot endure compulsion. As S. N. Federov pointed out at the 19th Party Conference, for many years we have had it drummed into us that a scientist is the hireling of state institutions, that he creates for wages from 9 AM to 6 PM with an hour off for lunch. The results from his work are put on a shelf at his institution. After this he is no longer concerned whether or not his products rot in safes or are patented in the name of the agency supporting the scientific research institution. Incidentally, this is very rare.

This "semi-feudal" system forces the few genuine scientists to print their work in the open press as soon and as broadly as possible. Being completely cut off from the possibility of obtaining economic benefits from or assistance in introducing results more rapidly than his colleagues, a scientist sees only one solution: saving prestige and priority, both his own and his country's. Paradoxically, such behavior was more patriotic and beneficial to the state than the useless hiding of results.

Again, we also deceive ourselves and authors also. The expert review document will have fewer signatures and seals. So what? In order to obtain "goods" from publication millions of authors will again have to bow down to millions of "overseers", who will either require additional expert reviews, or use their "right of the first night" and sign their names as coauthors. This has and will continue to happen many times. The possessor of a seal establishes his murky control procedure over a subject, no matter what. This cannot be stopped by Glavlit, a local science administration, nor the mutual authorization of scientists acquainted with the art of disclosure. Only somebody who has penetrated to the depths of a problem knows that future innovations are in the small things not noticed by an untrained observers.

Therefore, it would be most logical to replace all documents from institutions—leading factors in retarding the creative process in science, and turn to the traditional author's questionnaire. In it the author guarantees that he knows the rules for protecting state secrets and the patentability of ideas in his speciality and that in this work these rules are not violated. Of course, he should have recourse to consultants in case their are doubts. Controllers at the editorial level (but not chiefs), who, (together with the author and, if necessary, experts) will reject a certain percent of incoming material which is clearly a gross violation of secrecy rules.

In general, the system for protecting state secrets should be effective and unnoticed by creative workers and not have a negative influence upon the scientific information production cycle.

A few words about restrictive stamps [ogranichitelnyye grify]. Defense institutes and industries throughout the world intensively enrich civilian economies with spinoffs from their work. Western theoreticians improperly advance this thesis as a justification of the "usefulness" of the arms race. We are compelled to classify items, but this is a "semiconductor." A stamp is easily applied, but the reverse process is very difficult. The bureaucracy has learned how to use shortcomings in classification to cover up its inertia, slovenliness and lagging in scientific and technical work. There have been cases where people were punished for not applying a secrecy stamp, but nobody has ever been punished for using one in their own self-interest. This is misfortunate to the state. Glasnost has revealed only the tip of this iceberg.

In general, there should be no agency secrets. The protection of patentable discoveries and intermediate data is an interagency affair (except for state security, but there is a specific agency for this). For example, what can be secret about health care? Up until recently public health statistics were hidden from the public itself. Here there are only doctor's secrets, a narrow sphere of secrets resulting from the constitutional protection of individual rights. However, these are not agency secrets.

Should the stamp "for service use" be eliminated?

A review of the procedure for restricting the exchange of information in the scientific and local press is a very important stage in expanding the basis of perestroika. The criticism of central newspapers and journals freed from censorship is so far only trimming the crowns of trees in the bureaucracy, removing individual leaves. Only broadly based criticism of agencies from below can influence the roots of bureaucracy and force it to replace command-administrative paper pushing with business-like daily management work.

11574

Effects of Proposed Changes in Secrecy, Military Policies on Civil Production

18140030a Moscow NTR: PROBLEMY I RESHENIYA
in Russian No 17, 6-19 Sep 88 p 4

[Article by G. Pushkarev, chief, design sector, VNIIt-yazhmash [All-Union Scientific Research Institute for Heavy Machine Building] PO [Production Association] Uralmash [Ural Machinery]: "On 'Secret' Bolts and 'Regime' Nuts"]

[Text] Speaking from the podium of the 19th All-Union Conference of the CPSU, V. Kabaizze, director of the Ivanovo Stankostroitel'nyi [Machine Tool Building] Production Association, mentioned the primitivism of production organization in the country and the dominance of the physical economy at enterprises. He said it was "cretinism" that enterprises had to make their own standard items (in particular, bolts, nuts and screws).

If it were only bolts and nuts...

I did my first assembly work 30 years ago as a representative of a designers inspection group at the Zaporozhstal Plant, where a rolling mill built by Uralmashzavod was being installed.

I recall that a day or two after my arrival, when I had only just mastered the new situation, one of the managers at the shop under construction grabbed me by the hand and lead me to an excavator puffing away near the office. It had been built on a Belarus tractor which had also participated in construction.

"Here is an example of high quality hydraulics. Nothing is leaking, everything is working like a clock," he said, poking his finger at the first valve he saw. "Why don't you use finished products rather than making them yourself? None of your valves and distributors look like hydraulic equipment, but like crude, primitive copies."

It was true that the external appearance and size of Uralmash hydraulic equipment were considerably poorer than items made by "neighboring" ministries.

"But our hydraulic equipment is more reliable." I played the only convincing trump card, even though in my heart I with agreed operational workers. But how could I

explain to him, a production worker and not a designer, that it was a lost hope to use "something" from a "strange" parts assortment (not only in hydraulics), even if it were 100 times more reliable than "our own" design, more economical, productive, etc.

There is no centralized production of such items for all those who want them.

Has the situation changed since then?

The Ministry of the Machine Tool and Tool Building Industry's mass produced machine building hydraulic equipment and similar pneumatic, lubricating and cooling system parts have become more available to "neighboring users", but, frankly speaking, the remaining ministries and agencies had better not interfere. There is still no centralized interagency production of such items.

People who operate equipment and are not familiar with design practice often cannot understand why designers get into routines and do not borrow other minor components, but use their own. When you go to an enterprise to see how the machine you designed is working, they will complain: "This" they installed to replace something "similar" and "that" they replaced. If you rush to find the address of the manufacturer and for sources of information you are instantly in the dark.

Quite often it turns out that all of these, the "operators", the perfectly working wonders replacing original designs (this includes tank pumps, ship instruments, aircraft fittings, etc) have come to the plant by unknown paths, through three or four hands as a result of "parts exchanges", or have come from an industrial dump.

It was no accident, nor was it an oversight, that I used military terms in the previous paragraph. I mentioned them because in discussions about standardized, general machine building parts, there is a general theme—the civilian use of products from the defense industry and "equivalent" strategic areas (nuclear power engineering, cryogenic technology, etc). In particular, common fittings are used.

To illustrate, here is a simple example.

The MNLZ [Continuous casting machine] has several important, interconnected components. Among them are bearings in the so-called middle support. They are in contact with hot metal, are continuously cooled by water and thus require careful monitoring.

For several years designers at Uralmash struggled to develop "their own" design for a monitoring transponder. They looked at several ones made by instrument builders. Finally, they found one that sort of met requirements. The Neftekhimpribor [Petrochemical Instrument] SKB [Special Design Office] in Baku was the manufacturer.

Here is the chronology of relations between PO Uralmash and this organization.

March 1987—Request: Does the SKB have an instrument to monitor the flow of water?

April: Response: Yes, there is such an instrument, but to get acquainted with its technical documentation you must get permission from... (then followed the address and name of a Leningrad enterprise).

July 1987—Permission was obtained from the Leningraders and a new request made to Baku.

September 1987—The SKB sent the technical documentation. The design was quite suitable. It was only necessary to make some changes in a part and to find out conditions for ordering.

October 1987—A new request to the SKB, asking for additional explanations.

December 1987—Reminder about the request.

July 1988—Another reminder.

July 1988—Still no answer.

It turns out that the entire problem is that the Leningrad "master" of the instrument is not a civilian organization. It has not authorized the SKB to "reveal the secret". It is apparently not so easy to get a "signal" from outside. As a result, the work suffered.

Quick breaking joints, installed in the casting machine by the hundreds, are creatures of Uralmashzavod were completely used up, even though they are heavy, require lots of ~~service~~ (the plant cannot get minatures, they are not in ~~the~~ profile) and could be completely replaced by refined and reliable joint heads produced in the country for pneumatic system couplings on transport equipment. These are also a "closed item." For several years now they have been the subject of a struggle between Uralmash designers and "fund holders."

The quality of pipe joints and the entire set of so-called fittings used in various piping systems has become hard for designers to determine. Their quality is important for the external appearance, compactness, reliability and hermetic qualities of piping systems. All these requirements are met by joints used in aviation and shipbuilding. However, these are closed sectors. Each enterprise here must stew in its own juices.

Piping system designers are well aware of the so-called TsKBA [Central Design Office, A = not further identified] catalog. In addition to the ordinary (for the most part) pressure regulating, preventer and other equipment in this catalog, there are tens and hundreds of items which are not mentioned. Some are unique, highly

reliable and equal to foreign models. However, defense and nuclear power engineering machine building enterprises will not authorize anybody to use them.

The situation is similar for some types of pumps, usually the most compact and high powered ones used in ships. Although they are sometimes in the lists of enterprises producing them, they are not released for civilian uses.

So, let us draw some unavoidable conclusions.

Proven, "worked out", items from specialized ministries and agencies (the Ministries of the Motor Vehicle Industry, Aircraft Industry, Agricultural Machinery and other industries) should be accessible for use by outside groups. This means they must be declassified and included in sector and assortment catalogues. At present, only in the technical literature can one read about hydraulic and lubricating equipment, pumps, joints, piping systems and other items used in various sectors. There is no current information about these items.

Incidentally, this is fully in accord with USSR Council of Ministers' Decree No 65 (14 January 1988), authorizing the use of any fittings and materials, in particular for standardized products, without any previous agreements. Until the decree, the ministries manufacturing such items did not do this very eagerly, but only after much procrastination (just look at the joint heads mentioned). The lack of centralized information hinders access to developments.

Fittings manufactured by defense industry enterprises (in most cases they are an order "higher" than civilian ones) they should also become an object of glasnost and available for use in civilian items, except, obviously, in cases where this may damage state interests.

Apparently, in connection with the review of Soviet military doctrine, the production of this type of equipment will be reduced year after year. This means that there will be unused capacity (perhaps there is some already, but it is working away on inertia).

These measures will have obvious advantages for domestic industry and the entire national economy.

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USSR Supreme Soviet Attacks Lagging Computer Industry

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15 Aug 88 p 2

[Article by IZVESTIYA special correspondent A. Ivakhnov: "Electronics: In Pursuit of Yesterday"]

[Text] At a regular meeting of the commissions for science and technology of the chambers of the USSR Supreme Soviet, the deputies had to evaluate the work of the USSR State Committee for Computer Technology

and Information Science. N. Gorshkov, the committee's chairman, presented a report to the meeting's participants. His address consisted of a dull report written in the traditions of the pre-perestroika period.

But a coreport delivered by Academician V. Koptug, the head of the joint preparatory commission, in the name of the deputies sounded in the hall like an alarm bell. Carefully going into the state of affairs in the localities and then exchanging opinions at preliminary meetings, the deputies came to the conclusion that the lag of our country behind the world level in production and use of computer equipment has reached a critical, strategically dangerous level, and this, despite the measures adopted in recent years, continues to grow.

Then a discussion started, and it became clear that the question included in the agenda, as one of the speakers said, was only the tip of an iceberg, which the immense complex of urgent problems actually was.

Without going into details, the picture presented in the coreport was as follows: the requirements of the national economy for computers is being satisfied by no more than 30 percent and for peripheral and other auxiliary equipment by only 10 percent. Plans for the production of these products are not balanced, are inadequate and in addition are still not being fulfilled. In terms of reliability, domestic computers cannot in any way be compared with those produced by leading capitalist firms. Scientific institutions have an acute shortage of supercomputers. The position in regard to medium-class machines is slightly better. Personal computers produced by different departments are not compatible with each other. An information transmission system has not been created, and there is practically nothing to "pump" to users, for we do not have data banks.

Electronic machines are an inseparable part of the electric power industry. In the sector, more than 5,000 different-level automated control systems are in operation. But today Deputy Minister A. Dyakov complained that one-fifth of this equipment has used up its service life and requires replacement. By 1995, the other four-fifths of the electronic equipment will be in the same condition. The sector is not getting in full the stated equipment, and modernization of power systems is threatened with disruption. Operators because of breakdowns in the operation of computers are not in a position to provide an economical and breakdown-free condition of operation for electric power stations. Plans are not being fulfilled for the introduction of centers for personnel training. The sector's designers can only dream of automated design.

Machine-tool building has its own problems. The sector will have to establish as soon as possible 800 flexible automated production facilities. To design them manually is basically impossible as about 400 automated work stations of medium productivity are required. But only 46 have been acquired, Deputy Minister I. Ordinartsev

said.... We make machine tools with numerical control—we purchase all the electronics abroad for their delivery in developed countries. Hard currency is spent, and the effectiveness of trade is sharply reduced. We also produce such electronics but in its case the operation lasts 170 hours before it goes go out of order instead of the 10,000 hours achieved in world practice.

In the opinion of V. Mikhalevich, director of the Institute of Cybernetics of the UkSSR Academy of Sciences, a most acute problem is our lack of electronic mail, which has become no less customary abroad than telephonic communication—in management, the service sphere and everyday life. People living on different continents maintain contact with its aid, exchange information and think jointly in the solution of complex problems. In the opinion of Deputy Ye. Velikhov, both the book and the pencil will largely be replaced by a home display connected to a library computer. There is no longer any doubt that everything is moving in that direction.

So Deputy V. Semenikhin asked the question whether the brains of our developers have fallen into decline or whether our technologists think more poorly than western ones. It is quite something else: our scientists and engineers in the presence of a stagnant economic mechanism and our even more bureaucratic system can provide little help. They need all-round support, including from those sectors which do not tire of complaining about unsatisfactory deliveries and the low quality of computer equipment.

Our planning organs do not seem to be able to part with gross indicators, and the result is, as Deputy V. Koptug pointed out, that in the monetary sense the plan is seemingly being fulfilled, but in the products-list sense you have a complete catastrophe. Reports in monetary terms in no way express the true state of affairs. Goods are being produced that are far from prime necessities. At the same time, the production volume of storage disks and graph plotters fails to reach even half of what was planned. The USSR Academy of Sciences, Deputy Ye. Velikhov said, has been allocated 51 million rubles for the 5-year period for research in the field of computer technology. At the same time, foreign firms spend each year millions of dollars on these objectives. This situation must be radically changed. At the Ministry of Finance, Deputy A. Ishlinskiy noted, they are unable to agree on electronics people using gold for contacts, for without it machines and instruments will not operate. The state spends so much money on repairs that with passage of time the machines become more expensive than if they were made of gold....

Chemists demand modern computers but they themselves are in no hurry to solve the problem of super-pure materials. The construction-materials sector does not provide electronics people with needed alumina used in the manufacture of housings [korpusy] for integrated circuits. And builders! At the rate with which they erect

buildings of new plants, we shall not see the products of these enterprises even in the beginning of the next century. Can one be surprised under such conditions that original developments in computer technology, in no way inferior to the foreign supercomputers of which V. Mikhaylevich spoke, have been unable for years to make it to series production!

"External" factors undoubtedly do not remove either responsibility or the weight of concerns with sectors engaged in the production of computers, peripheral equipment and components for this equipment. Judging by the statements made, this is well understood in most ministries.

In the electronics industry, attempts are being made to get the problem of product quality to make headway. In the opinion of Deputy Minister E. Ivanov, neither technical control nor even state acceptance help in its solution: they are only engaged in the selection of poor-quality products. Pretrade and guaranteed repairs, he said, are our shame, our disgrace. At two of the sector's enterprises, they tried to create a system of ensuring quality, but... they ran into resistance both by executives and managers of these collectives. This means that in addition to organizational measures major explanatory work is still needed. And Deputy A. Ishlinskiy added that it is necessary to concern oneself with reliable means of diagnosis and spare units which can effectively replace those going out of order.

Deputies V. Koptug and Ye. Velikhov and Deputy Minister E. Ivanov directed the attention of the commissions to the unsatisfactory work of the Personal Computers Intersectoral Scientific and Technical Complex. The USSR Academy of Sciences and USSR Gosplan are not carrying out the decisions of directive organs on strengthening the material base of the intersectoral scientific and technical complex and boosting the efficiency of its work.

But let us return to the question recorded in the meeting's agenda. What is the opinion of the deputies on the first steps of the operation of the USSR State Committee for Computer Technology and Information Science? Without a doubt, the creation of the committee activated to a certain degree the whole complex of work along the line of its activity. It, however, in the opinion of Deputy Ye. Velikhov, is too slow in taking into its hands the reins of management. Deputies pointed out that the committee's efforts are now primarily aimed at the preparation of directive documents, but it displays little initiative in the realization of set targets and it is not exerting any perceptible influence on the technical level and quality of production. With the creation of the committee, USSR Gosplan turned over to it a significant portion of its functions. Today only two specialists are engaged in the planning committee on questions of computer technology, which, of course, contradicts both common sense and the actual idea that it is a central scientific-economic department. At the same time, the

USSR State Committee for Computer Technology and Information Science, as pointed out by Deputy A. Ishlinskiy, does not have any financial levers to exercise control over the most important operations, all of them being "scattered" among the ministries.

In the opinion of the deputies, the chief task of the USSR State Committee for Computer Technology and Information Science is to work for high quality, an advancing level of produced equipment and emergence on the world market. In this, it needs to rely more widely on the scientific and technical council in which the most important scientists and specialists have been assembled. It is necessary to expand the powers of the committee, to upgrade its status and to turn over funds to it for centralized financing of developments.

It is very important, Deputy I. Glebov said in concluding the meeting, to determine a strategic policy aimed at an accelerating development of domestic computer technology and information science, to work out a national program in this field and to strive for its incontestable realization. It would also be advantageous to examine the question on creation of a national-economic complex which would unite the sectors and implement a unified scientific and technical policy.

The concrete proposals of the deputies on overcoming the lag in this most important field of the economy were submitted to the directive organs.

**Reports From Annual Session of
Latvian Academy of Sciences for 1987**

Report on Presidium's Work

18140007 Riga IZVESTIYA AKADEMII NAUK
LATVIYSKOY SSR in Russian No 6, Jun 88 pp 10-18

[Speech by Academician of the Latvian SSR Academy of Sciences V. P. Samson, chief scientific secretary of the Presidium of the Latvian SSR Academy of Sciences, at the annual session of the General Assembly of the Latvian SSR Academy of Sciences, under the rubric "The Annual Session of the General Assembly of the Latvian SSR Academy of Sciences": "On the Work of the Presidium of the Latvian SSR Academy of Sciences in 1987"]

[Text] The presidium of the academy is submitting for discussion and approval by the General Assembly of the academy the account "The Basic Results of the Activity of the Latvian SSR Academy of Sciences for 1987." The account contains the basis theses of all the reports—both this one and the subsequent reports of the academician secretaries of the departments. By tradition the account was sent out in advance to all the members of the academy. Thus, the members of the academy had the opportunity to prepare for the session of the General Assembly.

This report corresponds to the scientific organizational portion of the account, but is supplemented by a critical and self-critical analysis. Moreover, it will be reported how the decisions of the preceding annual session of the General Assembly are being fulfilled.

The plans of scientific research work of 1987 and the assumed socialist obligations for the most part were successfully fulfilled.

The Institute of Electronics and Computer Technology (the Physical and Technical Sciences Department), the Institute of Biology (the Chemical and Biological Sciences Department), and the Institute of History (the Social Sciences Department) were the winners of the socialist competition among scientific institutions of the academy.

In accordance with the results of the All-Union Socialist Competition for 1987, two of our institutes—the Institute of Biology and the Institute of History—were awarded Challenge Red Banners of the USSR Academy of Sciences and the Central Committee of the Education, Higher Schools, and Scientific Institutions Workers Union. The experimental plant of the Institute of Organic Synthesis was awarded the Certificate of Honor of the CPSU Central Committee, the USSR Council of Ministers, the All-Union Central Council of Trade Unions, and the All-Union Komsomol Central Committee, which was established in honor of the 70th anniversary of the Great October Socialist Revolution.

In 1987 two prizes of the USSR Council of Ministers were awarded to our collectives: to the Institute of Electronics and Computer Technology—for the development and introduction of a family of general-purpose microprocessor aids; to the Institute of Microbiology imeni Avgust Kirkhenshiyev—for the development of preparations of microbic nucleases and related enzymes for genetic engineering, biotechnology, and medicine. Seven works of scientists of the academy were awarded the Latvian SSR State Prize, one work was awarded a prize of the Latvian SSR Council of Ministers.

The exhibits of institutes of the academy during the year under review at international and all-union exhibitions were awarded 4 gold medals, 8 silver medals, 24 bronze medals, and 30 certificates (see the table). This is approximately at the level of the preceding year.

Basic Indicators of the Efficiency of the Scientific Activity of the Latvian SSR Academy of Sciences in 1987 as Compared With Preceding Years

Indicator	1981-1985, average per year	1986	1987
Monographs	35	34	40
Doctoral dissertations defended	6	5	8
Candidate dissertations defended	50	34	48
Developments introduced in the USSR	137	77	106
Developments introduced in the republic	63	44	60
Inventions (applications in the USSR)	187	183	218
Foreign patents	26	23	26
New licenses (contracts)	4.5	3	7
Medals and certificates at exhibitions	45	66	66

It seems one can say that in recent years the Latvian SSR Academy of Sciences has had a large number of achievements. Its authority is recognized both in our country and abroad. We have confirmations of this and they will

be cited in this report. But I would like to say first of all that the election in December 1987 of two of our academicians to membership of the USSR Academy of Sciences was extraordinary recognition of the scientific

authority of our academy. B.A. Purin was elected a full member of the USSR Academy of Sciences, E.Ya. Gren was elected a corresponding member of the USSR Academy of Sciences.

In 1987 the 70th anniversary of Great October was widely celebrated in the republic, at institutes of the Academy of Sciences the scientific conference "Great October and the Present" was held. Two monographs of Academician A.A. Drizul: "Great October in Latvia" and "The History of Great October in Latvia" (2d edition), in which it is shown that the majority of workers of the unoccupied part of Latvia in 1917 were on the side of the Bolsheviks and participated in the October Revolution, were published. The monograph of A.I. Spreslis "The Latvian Red Guards in the Struggle for Soviet Power in 1917-1918," in which there is revealed for the first time the role in the establishment of Soviet power and in the civil war of the Latvian Red Guards, the representatives of the revolutionary Latvian proletariat, who were evacuated from enterprises of Riga to many large cities of Russia, was also published. Their combat deeds have something in common with the feat of the Latvian Red infantrymen, whose ranks they reinforced during the civil war.

The scientific report of Corresponding Member A.K. Biron, "On the Study of the History of the Great October Socialist Revolution," was heard at a meeting of the presidium of the academy. During the discussion of the report the attention of social scientists was directed to the need for the more thorough and comprehensive coverage of the history of the republic, especially the post-October period, the elimination of "blank spaces," the identification and interpretation of the new processes in the spiritual life of the republic, and the analysis and evaluation of the cultural legacy of the past.

In 1987 the ideological situation in the republic was aggravated. In connection with the attempts of western ideological centers to use the most difficult questions of the history of the republic for the organization of anti-Soviet demonstrations the scientists of the academy performed considerable propaganda and counterpropaganda work. Historians of the academy delivered 519 lectures and published 47 popular science articles, there were 40 radio and television appearances and 18 press conferences, round tables, and discussion clubs.

The Academy of Sciences reacted to the urgent suggestions of the creative intelligentsia, members of the academy participated in the work of congresses and plenums of creative unions. Thus, scientists of the Academy of Sciences and the Zinatne Publishing House assumed the obligation to publish a complete scientific collection of the works of the poet Aleksandr Chak, in connection with the fact that several previous editions were distorted. The presidium of the academy supported the

suggestions of the Union of Artists and the Union of Writers of the republic on expediting the establishment of the Institute of Architecture within the Latvian SSR Academy of Sciences.

It is necessary to say that under the conditions of glasnost and restructuring the activity of the academy is coming more and more often into the field of view of the public. Moreover, this attention is exacting. So that now not only directive organs, but also the public and journalists criticize us for mistakes and inaction.

But it seems that still there are significantly more examples of our positive activity. I would like to speak especially about this. As you know, the difficult ecological situation in the republic is at the center of attention of broad strata of the public, the creative intelligentsia, and scientists. Last year, under the conditions when the republic Committee for Nature Conservation had not yet been established in the republic, that is, when no one was officially dealing with these questions, a commission headed by Academician R.A. Kukayn was established under the Academy of Sciences. The commission performed a very difficult job—the ecological and economic evaluation of the plan of construction of the Daugavpilska Hydroelectric Power Plant. As a result of this work the government made the decision to cancel the construction of the Daugavpilska Hydroelectric Power Plant. The Chemical and Biological Sciences Department on its own initiative performed work on the formulation of a republic program of environmental protection and the efficient use of the resources of the Latvian SSR and on the establishment of the adverse ecological situation in the cities of Olaine, Ventspils, and Yurmala. In 1987 the Academy of Sciences and the Ministry of Higher and Secondary Specialized Education of the republic organized a scientific educational complex for ecology. The basic goal of this complex is the training of specialists in the field of ecology and the uniting of the efforts of academic and VUZ scientists. The presidium of the academy supported the proposal of the Chemical and Biological Sciences Department on the establishment under it of the cost accounting Ecology Center (for the performance of ecological evaluations, research, and development).

Scientific thinking was stimulated, discussions, for example, on the evaluation of the cultural legacy are being conducted. A large number of articles for discussion purposes: on the transition period from capitalism to socialism in the Latvian SSR; on the social structure of the countryside of Latvia on the eve of the 1917 revolution; on the architecture of a unique town of ancient Latvia on Lake Arayshi, were published in the journal IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR.

Remembering the speech of General Secretary of the CPSU Central Committee M.S. Gorbachev at the February (1988) CPSU Central Committee Plenum, we should thoroughly realize that social scientists are called

upon to formulate the theoretical bases of the ideological support of the restructuring of the economy and the social and cultural life of society.

During the year under review in February the election of new members of our academy was held. In all five new full members and eight corresponding members of the Latvian SSR Academy of Sciences were elected. As you recall, both the nomination of candidate members of the academy and the very course of the election testified to a democratic approach to the settlement of this important question.

The election was announced for 5 vacancies of full members and 10 vacancies of corresponding members. Only 28 candidates, from whom the general assemblies of the departments elected 13 for subsequent voting, were registered for participation in the election. None of the registered candidates received the necessary number of votes for two vacancies of corresponding members in the specialty "Medicine" during the voting in the Chemical and Biological Sciences Department.

I should note that in connection with the adoption of amendments to the Charter of our academy a large number of other vacancies of members of the academy have appeared here, and, consequently, it is necessary to prepare for a new election.

At the February session of the General Assembly a new presidium of the academy was also elected. Half of the personnel of the presidium were replaced. At the same time the election of new members of the departments was held, approximately one-third of their personnel were replaced.

To this list of changes of scientific management personnel of our academy it is necessary to add that one director of an institute and a number of deputy directors of institutes and managers of divisions and laboratories were replaced. These changes were in the direction of the promotion of substantially younger personnel. It is possible, by stretching the point, to conclude that the process of decreasing the age of scientific management personnel has begun at our academy. However, this process is difficult, if only because in previous years the necessary reserve for promotion was not created. In particular, the commission, which checked the activity of the Institute of Physics over the preceding 4 years, noted this. It must be said that the term of office of a number of directors of institutes expires this year. Apparently, the elections at these institutes will be held in conformity with the new version of the Model Charter of the Institute, the corresponding amendments to which have to be considered at this session of the General Assembly. The active participation of the labor (scientific) collective in this important matter is envisaged.

The institutions of the academy, in fulfilling the decisions of the presidium and the party committee, gave assistance in carrying out the reform of the general

educational, vocational, and higher school in the republic. Scientists of the academy made a definite contribution to the development of textbooks, teaching aids, and methods and to the increase of the skills of teachers of schools and educators of higher educational institutions. As patrons the scientific institutions of the academy are giving schools assistance in the strengthening of the material base, in the carrying out of the labor training and education of school children, and in the promotion of the creative technical work of young people. However, in light of the decisions of the February (1988) CPSU Central Committee Plenum, which posed the task of radically restructuring the entire system of the training of personnel and the education of the rising generation, the academy, its scientific institutes, and scientists are called upon to provide much assistance to the newly established Ministry for Public Education. It is necessary to increase the attention to the further development of scientific research at higher educational institutions and to the broader participation of scientists of the academy in the educational process and to thoroughly analyze and use the experience of the already operating educational scientific production complexes of the academy and the higher educational institutions of the republic.

The year under review, 1987, as a whole is characterized by the increase of the overall numerical indicators of the activity of the academy as compared with preceding years. Judge for yourselves. The indicators that characterize the effectiveness of basic research: the number of monographs and defended dissertations (see the table) increased. Will these indicators remain at the same level in the future as well?

As chairman of the Editing and Publishing Council I can say that an average number of monographs on the order of 40 is also anticipated in future years. Owing to the steps taken in previous years the publishing portfolio is now filled with manuscripts of monographs. And the possibility of choosing the best ones exists. Our leading scientists, as well as a number of young scientists understood that monographs are one of the most significant indicators of the authority of a scientist in the field of basic research. Unfortunately, a number of scientific associates of the Institute of Philosophy and Law, the Institute of History, and others are delivering to the publishing house unfinished, inadequately polished manuscripts.

As to doctoral dissertations, now we do not as yet have optimism. True, as a result of the making of the demands of the presidium more strict and the efforts of the boards of directors of institutes (I have in mind the granting of creative leave to dissertation writers) in 1987 the situation improved somewhat as compared with previous years.

As to the subsequent program of work on this question, it should be predicted in which of our priority directions we need doctors of sciences and how many doctors of sciences, moreover, young doctors of sciences—35-40

years old—we need. (The average age of our doctors of sciences, who are now defending themselves, is 47.) Meanwhile the average age of the 122 doctors of sciences, whom our academy now has, is far from 50 and far from 55. This next figure is 58.

So far we have done little to correct the situation. The departments and institutes should identify promising young scientists 30-35 years old, specifically watch over them, and namely relieve them for a while from other duties, especially from organizational work, and grant them travel warrants for practical studies and for participation in conferences that are being held in the union and abroad. It is necessary to constantly keep track of the scientific growth of these scientists.

Concerning the effectiveness of applied research I should say that the figures were initially greatly overstated. The presidium at its meeting on 11 February 1988 analyzed in detail the state of affairs with introduction. The following was found.

Through the fault of introducing organizations several items of the plan of the introduction of developments were fulfilled only in part. Thus far the manufacturing plants of a number of developments of the Institute of Inorganic Chemistry, the Institute of Microbiology, the Institute of Wood Chemistry, and other institutes have not been specified, although the developments were included in all the plans of assimilation. Institutions of the academy did not eliminate the shortcomings noted by the Latvian SSR Committee of People's Control, namely: often unsubstantiated data on the number of introduced works and their economic impact are submitted to superior organizations and the State Committee for Statistics. This is a chronic disease, but, it seems, hardly anyone is in a hurry to get rid of it.

The presidium pointed out to institutions of the academy the intolerability of the distortion of statistical reporting; to the Physical and Technical Sciences Department and the Chemical and Biological Sciences Department—the inadequate checking of submitted statistical data.

The presidium required the bureaus of the Physical and Technical Sciences Department and the Chemical and Biological Sciences Department to examine the personal responsibility of the directors of institutions for the submitting of unsubstantiated reporting data.

The presidium addressed to the Latvian SSR State Planning Committee the request to specify the enterprises for the production of highly efficient developments by the removal of obsolete products from production.

The presidium also informed management organs of the republic that a number of enterprises had not fulfilled their obligations on the volume of introduction of developments that had been proposed by institutes of the academy.

The year 1987 was the first year of operation of republic interbranch scientific technical complexes. Our Academy of Sciences is taking part in the work of six republic interbranch scientific technical complexes and three union interbranch scientific technical complexes. For three republic scientific technical complexes the academy is the head organization. The first significant results have been obtained. For example, at the Latvian biotekhnologiya Republic Interbranch Scientific Technical Complex a new hormone, which is used when transplanting embryos, was developed in a short time (4 months) from waste products of the meat industry. However, the republic interbranch scientific technical complexes continued to experience substantial difficulties in connection with the fact that the questions of the financing and the material and technical supply of the operation of the republic interbranch scientific technical complexes were not completely settled. Ministries and departments have not organized extensive production on the basis of developments of republic interbranch scientific technical complexes. The establishment and development of republic interbranch scientific technical complexes, as well as educational scientific production complexes substantially strengthened the interaction of academic, VUZ, and sectorial science in the republic.

During the year under review the presidium of the academy devoted much attention of the consolidation and development of the Engineering and Technological Center. The center is developing work on the duplication of developments of both academic institutes and higher educational institutions for the needs of industry of the republic. A list of the most promising developments of the center for the 12th Five-Year Plan was approved: robotic complexes, microprocessor modules, vibration equipment, automated fermenters, units for the application of corrosion-proof and wear-resistant coatings, and others. A demonstration testing area of robotics, which is, in particular, an educational base for specialists of the national economy of the republic and students of Riga Polytechnical Institute, operates under the center.

During 1985-1986 the Latvian SSR Academy of Sciences was the initiator of the sharp intensification of research in the field of machine building in the republic. The Mashinostroyeniye Republic Interbranch Scientific Technical Complex was established (the head organization is Riga Polytechnical Institute, the director of the complex is Corresponding Member of the Latvian SSR Academy of Sciences E.E. Lavendel, rector of the institute). Having examined the progress of the evolution of research and development on machine building, the presidium of the academy supported the proposal of Riga Polytechnical Institute on the establishment under it during 1987-1988 of the Scientific Research Institute of Machine Building. The coordination of the work of this scientific research institute was assigned to the

Physical and Technical Sciences Department. Taking into account that structural subdivisions in the directions of machine building will be organized within the Engineering and Technological Center of the academy, cooperation is planned in 1990 between the Engineering and Technological Center and the Scientific Research Institute of Machine Building within the Mashinostroyeniye Republic Interbranch Scientific Technical Complex.

Both the General Assembly of the academy and the presidium of the academy repeatedly devoted much attention to the questions of inventing, patent, and license work. At the last annual session of the General Academy there was noted, in particular, the decrease in recent years of inventing activity. Against the background of previous years the 1987 results are better (see the table). The number of submitted applications for inventions increased. The number of new licenses increased. Nevertheless, when analyzing these results, the presidium considered it necessary to point out to institutions of the academy the inadequacy of the patent research being conducted, the ultimate goal of which is the assurance of the competitive ability of developments and the sale of licenses. The presidium also required the Council for Patent and License Affairs to improve the methods supervision of these matters.

Now the procedure of international scientific relations has been substantially simplified. Effectiveness has become their main criterion. The establishment of direct contacts between institutes of the Latvian SSR Academy of Sciences and scientific organizations of the socialist countries is being encouraged. This is a change that has already occurred in the policy of our international scientific relations. Direct contacts have already been established with approximately 10 organizations of the socialist countries, on our part 6 institutes are participating in them. Moreover, on 2 October 1987 in the Presidium of the Latvian SSR Academy of Sciences talks were held and a bilateral agreement on direct cooperation for 1988-1990 between the Latvian SSR Academy of Sciences and the Polish Academy of Sciences was signed. Joint research on 11 themes will be conducted. On the part of our academy 8 scientific institutions are participating, on the part of the Polish Academy of Sciences 10 institutions are.

During the year under review mutually advantageous cooperation with scientific centers and firms of capitalist countries also continued to be developed. Thus, the Institute of Biology fulfilled obligations in conformity with the Soviet-Danish and Soviet-Swedish agreements on the economic aspects of the protection of the waters of the Baltic Sea and studies of populations of birds and on the compilation of a Red Book of the region. The Institute of Organic Synthesis on a cooperative basis collaborated with firms of Japan, France, the United States, and the FRG on the development and testing of new drugs.

If we speak about the effectiveness of our international cooperation in the area of applied development, the seven newly concluded contracts for developments of our academy, as well as the exports of our experimental plants for significant amounts are the best evidence of this. Here, first of all, it is necessary to note the foreign economic activity of our Institute of Physics, Institute of Physics and Power Engineering, and Institute of Organic Synthesis and the experimental plants of the Institute of Microbiology imeni Avgust Kirkhenshteyn and the Institute of Organic Synthesis.

At the same time it is necessary to point out that in many instances the broadening of cooperation is not yet accompanied by the corresponding qualitative changes and an increase of efficiency. It is necessary to use cooperation for the speeding up of the accomplishment of planned work of the academy and the use of the results in the national economy. On this level on our part it is necessary to send young promising scientists, about whose scientific growth we are obliged to worry, first of all on foreign missions, to conferences, and for practical studies at the scientific laboratories of our partners. Here it is worth thinking about some age restrictions for foreign trips, for example, half of those being sent can be up to the age of 35.

The questions of the automation of research and the establishment of a modern scientific and technical information system in 1987 were constantly under the control of the presidium of the academy. The progress of the work on the establishment of the information bank of the Main Library and the concept of the development of the information network of the academy were specially examined. Computer hardware is being simultaneously used for the automation of experiments, the storage and retrieval of information, and the automation of the simulation of systems of large dimension. The automation of a number of processes of the scientific organizational activity of the staff of the presidium of the academy has begun. Three basic zones of the information network of the academy have been distinguished (the Academy Campus, Salaspils, the Skyscraper). At the same time as the establishment of the information bank of the Main Library databases in a number of priority directions of scientific research, which is being conducted at the academy (at the Institute of Inorganic Chemistry, the Institute of Organic Synthesis, and the Institute of Polymer Mechanics), should be established. The presidium of the academy directed attention to the need for the strict monitoring of the implementation of the adopted programs on automation.

The presidium of the academy drafted and submitted for consideration by the government of the republic a plan of the long-term development of the academy and a program of steps on the improvement of the working and living conditions and the medical service of personnel of the academy. However, it must be acknowledged that the questions of the social development of the academy are not being settled vigorously enough.

The presidium of the academy examined the results of the regular checks of the Institute of Language and Literature imeni A. Upit, the Institute of Physics, and the Institute of Inorganic Chemistry. The results of the scientific activity of the mentioned institutes for the period being checked were deemed positive; recommendations on the further concentration of research in priority directions and others were given. At the same time shortcomings were noted in the scientific organizational activity of the institutes: the failure to settle the question of reducing the age of scientific associates of the institute and the lack of a reserve of managerial scientific and scientific organizational personnel (the Institute of Physics), the inadequacy of the pace of the generalization of the most important results in the form of monographs and doctoral dissertations (the Institute of Inorganic Chemistry), inadequate attention to the training of personnel of the highest skill in linguistics and art criticism (the Institute of Language and Literature imeni A. Upit).

The presidium checked and at its meetings discussed the course of the fulfillment of the decrees that were adopted in accordance with the results of the checks of institutes, which were made the preceding year. The presidium ascertained that the noted shortcomings had been partially eliminated. The presidium satisfied itself that the institutes and the corresponding departments have opportunities for fulfilling the decrees fully.

It should be acknowledged in a self-critical manner that the presidium has not succeeded in the 1980's in expanding substantially the usable area of the Central Archive, as a result of which institutes have been forced to store archive collections on their own premises. The unique collections of the Main Library, which remained in the old building along Ulitsa Komunala, are in a critical state. In short, the presidium should return in the future to the question of building a second section of the Main Library.

In the reports the analytical section is still weak. It is necessary to begin the estimation of the significance of a theme itself and what has been done with the division, the laboratory, then the scientific council, in order to outline the prospects better. However, as at the last annual General Assembly, I should acknowledge in a self-critical manner that the presidium has not succeeded in seeing to it that the submitted report of the academy is critical and analytical. The presidium has repeatedly reminded the institutes and divisions of the Central Staff of the necessity of submitting an analysis of the state of affairs and recommendations for the future. Apparently, the laxity of the chief scientific secretary of the presidium and other executives of the presidium is to blame. This is one of the main causes. But is this the only one?

I should say that the fulfillment of the assignment of the last annual General Assembly on the restructuring of the work of the staff of the presidium has not been completed. The chief executives of the presidium bear the

responsibility for this. Explanations and excuses again, of course, exist. But until this is done, there will not be an effective return from the staff.

Under the conditions of the restructuring of the work of the academy, the independence and initiative of the departments of the academy have increased. In conformity with the new statutes the plans of scientific research, development, and introduction are now reviewed and approved by the departments. The role of the departments is now increasing even more, a new system of financing is being introduced.

In connection with the small size of the existing Central Staff of the academy, it has been decided to leave a common staff for the presidium and departments of the academy. However, the work for departments has been increased (moreover, a large amount of work!), while the staffs have not been reinforced. It must also be acknowledged that the Latvian SSR Academy of Sciences has been faced with substantial difficulties in the matter of manning the staff with skilled personnel due to the low wage that is envisaged for scientists who engage in organizational work. True, in conformity with the new charter of the academy the position of exempt deputy academician secretary for organizational work is being introduced in the departments, which will strengthen significantly the management nucleus of the bureaus of the departments.

The presidium of the academy at the suggestion of the departments has eliminated a number of scientific councils. The replacement of the staff of other councils and editorial boards of journals lies ahead.

With respect to its activity in 1987, the Presidium of the Academy of Sciences draws the following conclusions.

During the year under review, the majority of assignments of the General Assembly were fulfilled. It was possible to make progress in the matter of developing and consolidating republic interbranch scientific technical complexes and the Engineering and Technological Center. The interaction of academic, VUZ, and sectorial science in the republic increased. Owing to an active stand the authority of the Latvian SSR Academy of Sciences in the republic with regard to the questions of the formulation and implementation of a policy of scientific and technical progress, in the area of ecology, and in the area of the social sciences increased. The monitoring of the fulfillment of adopted decisions was tightened up. The efficiency of the presidium increased.

However, in critically evaluating the organizational work done in 1987, it is necessary to note that the progress in the following directions of organizational activity was inadequate. As before, the pace of the strengthening of the experimental base is lagging greatly. The questions of the social development of the academy were not worked on persistently enough. The principle of the annual replacement of 5 percent of the scientific personnel by

the attraction of young specialists is being poorly implemented. The question of a reserve of scientific management personnel is urgent. The fulfillment of the decision of the General Assembly on the carrying out of the certification of personnel of the staff of the presidium was dragged out.

The presidium will work in 1988 on eliminating these shortcomings and others, which have been noted in this report.

Moreover, the items, which are listed in the introduction to the written report of the academy, remain at the center of attention of the work of the presidium. Of them I particularly want to note the following ones:

- the concentration of scientific forces on priority directions;
- the development of interbranch scientific technical complexes;
- the consolidation of the experimental base and the Engineering and Technological Center;
- attention to social questions of the life of the academy;
- the democratization of scientific organizational life.

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Report of Technical, Physical Sciences Department

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[Speech by Academician of the Latvian SSR Academy of Sciences A.F. Krogeris at the Annual Session of the General Assembly of the Latvian SSR Academy of Sciences under the rubric "The Annual Session of the General Assembly of the Latvian SSR Academy of Sciences": "The Basic Results of the Activity of the Physical and Technical Sciences Department of the Latvian SSR Academy of Sciences for 1987"]

[Text] The Physical and Technical Sciences Department in 1987 implemented a number of measures on the improvement of its work. The staff of the department was substantially reinforced with highly skilled scientists from institutes of the Latvian SSR Academy of Sciences, higher educational institutions, and industry of the republic, which made it possible to improve the structure of the department. Such important directions for our republic as mechanics and machine building, electronics and automation are represented in it. However, the mathematical and power engineering sciences and individual directions of physics are not represented.

All the members of the bureau of the department have specific assignments: on the making of contacts with higher educational institutions and industry, the methods supervision of the activity of republic interbranch scientific technical complexes, temporary collectives,

and scientific councils, and other questions. It is necessary to devote substantially more attention to the coordination of basic research and to enlist scientists of higher educational institutions and sectorial institutes more extensively in work in the priority directions of science and in the fulfillment of republic and all-union goal programs and scientific and technical programs.

In 1987 the productivity of the work of institutes of the department increased somewhat. The number of received inventor's certificates and positive decisions increased, foreign contacts were stepped up—six foreign economic agreements were concluded, the contacts with industry became more effective—the number of introduced works increased by 1.5-fold and the annual economic impact increased by more than twofold.

A number of new results were obtained at the Institute of Physics in the area of magnetohydrodynamics. The conditions and mechanisms of the self-excitation of a magnetic field, which confirm the basic assumptions of the theory of a helical dynamo, which was advanced at the institute, were determined at a large-scale experimental facility. The mechanism of the self-excitation of a magnetic field was recognized as the source of astrophysical magnetic fields, which plays an important role in the processes that take place in the large flows of molten metal heat transfer agents, which occur in the blankets of thermonuclear reactors and in breeder reactors.

The results of the study of the magnetohydrodynamic principles of strong current technological processes made it possible to develop a new generation of submerged-resistor induction furnaces and electrolyzers for obtaining aluminum and magnesium.

The use of the effect of an electromagnetic field on the process of growing single crystals is making it possible to improve substantially the quality of the latter. The discovered mechanism of forced convection in a melt, which is due to the presence of a thermoelectromotive force and thermoelectric currents at the phase boundaries, is affording new opportunities for the improvement of the crystalline structure.

The use of the effect of long-range magnetic forces on the formation of spatial concentration structures in magnetic fluids is making it possible to develop a new method of controlling the dispersed composition of magnetic colloids by the method of magnetic separation.

The development and introduction of a new type of gamma radiation—a radiation circuit—in 1987 were commended by the Latvian SSR State Prize in Science and Technology.

Two magnetohydrodynamic agitators for the production of silumin and aluminum alloy were introduced at the Novokuznetsk Aluminum Plant.

Within the Bytovaya apparatura Republic Interbranch Scientific Technical Complex, two temporary scientific and technical laboratories were organized on the basis of the institute for the introduction of magnetic fluid in acoustic systems at the Riga Radio Plant imeni A.S. Popov and units for soldering printed circuit boards by means of a magnetohydrodynamic wave generator at the VEF and Radiotekhnika production associations.

Jointly with the Center of Robotics four new EMAGO units for automatic assembly lines are being designed and will be produced in accordance with a commercial agreement with the English firm John Brown, an agreement for the delivery of magnetohydrodynamic agitators has been signed with the firm Chemocomplex (Hungary).

At the Institute of Polymer Mechanics, the basic research was focused on the development of the scientific principles and applied methods of the designing of new composite materials and elements of components made from them, as well as on the elaboration of methods and means of diagnosing their mechanical properties.

A set of theoretical studies was generalized in two monographs that were published in 1987. In the monograph of A.Ye. Bogdanovich nonlinear problems of the dynamics of thin-walled cylindrical shells made of fibrous and laminated composites, which make it possible to calculate their nonstationary deformation, dynamic stability, and destruction and to predict the mechanical strength characteristics of real load-carrying structures, were solved. In the book of Yu.M. Tarnopolskiy et al. the basic structural and technological parameters of a new class of construction materials—spatial reinforced composites, which are promising for items of new equipment, were cited.

A problem-oriented bank of abstract information on composite materials with an automated retrieval system, which encompasses 170 periodicals and today contains 3,500 documents and which should be supplemented with no fewer annually, has been established.

New results were obtained with respect to the increase of the effectiveness of the dispersed filling of polymer materials, particularly when using hybrid granular-fibrous fillers. Polyethylene pipes, which are filled with short glass fibers and powdered graphite or aluminum and have a higher thermal conductivity, were produced in accordance with such a formula. The heat exchangers made from them are undergoing performance tests at the Latvijas siltums Production Association.

The institute jointly with the Special Design Bureau of Scientific Instrument Making developed a new series of instrument of the nondestructive testing of the physical characteristics of composites on a microprocessor base, in particular, light transmission meters and a set for the

study of acoustic emission. The ZINAP-MIKRO microprocessor modular system is ensuring the prompt development of a large number of new instruments of a similar type.

The Institute of Electronics and Computer Technology is the leading one in the country in the development of information computer networks. In 1987 basic research on the architecture of networks and on the devising of methods and the development of software of territorial and local area networks yielded a number of new results. A substantial change last year was achieved in the development and the organization of the industrial production of hardware of information computer networks. Thus, owing to many years of fruitful relations, in 1987 the production of packet switching units was organized at the Moscow Energopribor Plant. These units together with the previously assimilated microprocessor adapters today constitute a complete set of hardware for the construction of regional information networks of computers of the YeS and SM series.

Work is being actively performed on the development of the software and hardware of local computer networks. At present a set of means for a problem-oriented local area network (POLS) is being transferred to the Radiotekhnika Production Association. The set of means realizes the interaction of minicomputers like the SM-4 with microcomputers like the Elektronika-60 via a multidrop line at 10 megabits per second. Such a local area network is intended for the accomplishment of a problem-oriented set of tasks, which are connected with the automatic control of technological processes, scientific research, or designing. For series production a multidrop-line transport network was turned over to enterprises of Minsk, while for the meeting of the needs of the USSR Academy of Sciences a transport station was turned over to the Scientific Production Association of the USSR Academy of Sciences in Leningrad. These means are intended for uniting into a single system on the basis of a high-speed multidrop line of hardware of different series of large computers, minicomputers, and microcomputers, which ensures the high reliability of the information being transmitted.

Of the basic research, which is being conducted at the Institute of Physics and Power Engineering, one should note the theoretical and experimental studies of electron processes in organic molecular crystals, which are generalized in the work that was prepared by E.A. Silinsh jointly with scientists of the Ukrainian SSR Academy of Sciences and the CSSR Academy of Sciences. The use in these studies of the method of the computer simulation of the processes of the separation and transfer of charge carriers in case of their photogeneration is of interest. Computer simulation in the specific case makes it possible to solve for the average parameters of transfer the analytically unsolvable Fokker-Planck equations and thereby to obtain visually observable trajectories of an average electron in an internal Coulomb and an external electric field with consideration for the random diffusion

and loss of energy in the process of thermalization. Recently they succeeded in detecting experimentally the conditions of the generation of nonthermalized hot charge carriers, which were determined on the models. A synthetic experiment of this type can be used extensively for the study of phenomena that are inaccessible for direct experimental observation (average parameters, extreme intensities of external fields and temperatures). Organic molecular crystals, studies of which the institute is conducting jointly with the Institute of Organic Synthesis, are promising materials for a rapidly developing direction—molecular electronics.

At the institute the theoretical bases of impedance microwave transducers were formulated and a number of instruments, which contain waveguide, coaxial, slotted, and capacitance-inductance radiating elements, were developed. Test batches of instruments were produced and a technology of the stage-by-stage checking of semiconductor and metal film structures, which are finding use at many enterprises of semiconductor instrument making, were developed. The series production of instruments based on transformer two-circuit vortex current converters, the confirmed economic impact from the introduction of which comes to 1.5 million rubles, was organized at enterprises of Kirov. Two commercial agreements for the transfer of the instruments to Hungary and Bulgaria were also concluded.

Within the Latvian SSR Energy Program, on the basis of basic research on the mathematical simulation of complex power systems, the institute jointly with the Latvglavenergo Production Association, the USSR Ministry of Power and Electrification, and the special design bureau of the Energoprojekt Institute developed and introduced an automated technology of the designing of electric networks and systems. Its operation is based on 1) the information bank of data on the Latvian SSR electric power system and the future loads for a period of 15-20 years, which was realized at the computer center of the Latvglavenergo Production Association, and 2) the information computer complex, which was established at the institute and contains a similar set of information, evaluation, and optimization programs. The optimum strategy of the planning of the development of electric power systems, which is ensured by the proposed technology, makes it possible to decrease energy losses in networks, to save material and raw material resources, and to increase the quality of electric power supply. The anticipated annual economic impact from the introduction of this system for the Latvian SSR for the period of 1990-1995 will exceed 1 million rubles.

Shortcomings and difficulties are still occurring in the work of the institutes of the department. The institutes are developing slowly their participation in the new forms that are intended for the strengthening of the contacts between science and production. Thus far the priority status (including with respect to material and financial supply) of republic goal programs and scientific

and technical programs has not been ensured. The institutes of the department are still using too little such an effective form of the intensification of the solution of specific scientific and technical problems for the national economy as temporary laboratories and groups. Although the changeover of the institutes to the new conditions of financing is planned already during the new year, today neither here nor in the departments of the USSR Academy of Sciences, except for the general provisions, is there clarity either concerning financing or concerning which newly formulated all-union scientific programs our institutes will participate in. The new forms of the conclusion of economic contracts (through which a significant share of the outlays of the institutes of the department should be provided) have been reported to the institutes, but the standards necessary for their implementation are thus far not known. The difficulties, which were discussed at last year's session of the General Assembly of the Latvian SSR Academy of Sciences, remain unresolved. There have been no improvements in the strengthening of the material base of institutes and the replacement of equipment; changes in supply are not noticeable—the institutes of the department are experiencing an acute shortage of advanced computer hardware; the urgent questions of the support of the social sphere of those working in the system of the academy are not being settled.

The decision on the annual reduction of the age of personnel, which was made by the Presidium of the Latvian SSR Academy of Sciences, cannot be implemented, if there is no possibility of making living space available to young specialists even in a dormitory. It is necessary both on the part of the Academy of Sciences and on the part of management organs of the city and republic to give more attention to all these questions.

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Report of Chemical, Biological Sciences Department

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[Speech by Academician of the Latvian SSR Academy of Sciences R. A. Kukayn at the Annual Session of the General Assembly of the Latvian SSR Academy of Sciences under the rubric "The Annual Session of the General Assembly of the Latvian SSR Academy of Sciences": "The Basic Results of the Activity of the Institutes of the Chemical and Biological Sciences Department of the Latvian SSR Academy of Sciences for 1987"]

[Text] The activity of the Chemical and Biological Sciences Department during the year under review was aimed at the implementation of the directives of the 27th CPSU Congress on the radical restructuring of science in

the country, the increase of the role of basic science, the increase of the practical return, and the concentration of forces on the priority directions.

At the Institute of Inorganic Chemistry, the successful development of the priority direction of plasma chemistry, in which the institute is the head institute in the country, was continued. In the field of electrochemistry the mechanism of mass transport across liquid membranes was established and its fundamental regularities were clarified, the possibilities of its intensification were shown. Several arrangements and modular devices with closed cycles for the extraction and concentration of ions of metals were developed.

At the Institute of Organic Synthesis, new gains were made in the synthesis of medicinal preparations for medicine and veterinary science. This is a very important direction, inasmuch as a shortage of effective medicines exists in the country. A large share of all synthesizable drugs in the USSR were developed by the Institute of Organic Synthesis. In 1987 a number of selective vasodilators in the class of dihydropyridines—antagonists of calcium ions, which selectively dilate the blood-carrying vessels of the heart, brain, and extremities and regulate their functions—were developed on the basis of the study of chemistry, physical chemistry, and pharmacology. These preparations are of great importance for health care, since the death rate from cardiovascular diseases continues to hold first place.

The first three industrial series of preparations that were developed at the institute: an original antihypertensive agent, the anti-anginal agent foridon, and the antileukemic agent cytarabine, were produced at the Experimental Plant of the Institute of Organic Synthesis.

The Institute of Microbiology for the first time in the USSR developed a technology of obtaining luteinizing hormone from the hypophysis of pigs, while 10,000 doses of the preparation, which is necessary for the embryo transplantation and hormonotherapy of large-horned cattle, as well as man, were obtained at the Riga Meat Combine. The introduction of the domestic technology will make it possible to abandon the importing of the indicated hormone.

The Institute of Wood Chemistry being the head institute in the country, continued to develop research on the formulation of the scientific principles of wood processing. In 1987 at the institute the peculiarities of the process of the delignification of juvenile wood were studied for the first time and the scientific principles of a technology, in accordance with which it is possible without the use of chromium bleaching to obtain high quality pulp for chemical processing, was developed. The decrease of the production cost of pulp and the increase of the ecological cleanness of the process (the cutting of juvenile spruce wood) are being planned. The

work is of great importance for practice, inasmuch as precisely pulp production in the paper industry is one of the most serious polluters of the environment.

At the Institute of Microbiology imeni Avgust Kirshenshteyn up to now microorganisms and viruses were the subject of research; in 1987 the study of a new class of microorganisms—viroids, which are more primitively constructed than viruses, was begun.

In 1987 the development of a new scientific direction was commenced—highly sensitive methods of identifying viroids for the purpose of studying the mechanism of their replication with the subsequent obtaining of recombinant viroids, which have lost infectiousness, but have retained a high replication potential, were developed on the basis of synthetic oligodeoxyribonucleotides. This work is of great importance for the development of genetic engineering work, as well as the practice of combating pests of agricultural crops.

At the Institute of Biology the scientific conception of cadaster studies of the rivers of Latvia and a system of the comprehensive ecological evaluation of the state of inland bodies of water were developed and received a high rating in the country. Practical recommendations for the restoration of the ecological equilibrium of small rivers of the republic were formulated on this basis.

The impact of the exhaust of motor transport on agricultural crops was studied. It was established that in plants, which grow in the immediate vicinity of a road bed, there is a decrease of the ground biomass (by up to 27 percent) and the number of grains in the caryopsis (14-22 percent), as well as the content in the grain of irreplaceable amino acids: methionine, valine, and lysine (respectively 76, 87, and 24 percent) as compared with the control. This testifies to the reduced biological value of the protein and the deterioration of the quality of the grain as a source of food. It should be noted that the State Agroindustrial Committee did not agree to accept the system, which was proposed by the Academy of Sciences, for the organization of roadside plantings, justifying the rejection by the fact that valuable agricultural lands would be lost.

The Institute of Biology submitted to the Latvian SSR Council of Ministers expert conclusions, which characterize the ecological situation in Yurmala and Olayne, as well as the ecological situation and the problem of urban development in Ventspils.

At the Botanical Garden important work is being performed on the preservation of rare plants and plants that can be protected, a seed nursery has been established. Among the plants that can be protected is wax myrtle, which has been entered in the Red Book of the USSR and the Latvian SSR. This is a medicinal plant, a source material for the production of Riga Black Balsam. Intensive work on the development of new decorative crops

was continued. This work was commended by certificates and medals of international exhibitions and the Exhibition of USSR National Economic Achievements.

The department performed much organizational work on the additional ecological and economic evaluation of the detail design of the construction of the Daugavpils-kaya Hydroelectric Power Plant. In all more than 40 specialists of institutions of our republic, the Belorussian SSR, and the USSR Academy of Sciences participated in the work of the commission. As a result suggestions for the government of the republic and the Union were formulated. The USSR Council of Ministries adopted a decision on halting the construction of the Daugavpils-kaya Hydroelectric Power Plant (the Daugava River valley was preserved).

The established scientific technical complexes played a significant role in restructuring the organization of the introduction of scientific developments. Two republic interbranch scientific technical complexes, the Antikor and the Latvijas biotekhnologiya complexes, operate in the department, the latter is the largest in the republic. In all 23 institutions of the republic are a part of the Latvijas biotekhnologiya Republic Interbranch Scientific Technical Complex. Of the 622 assignments of the complex for the 12th Five-Year Plan 90 were completed, the economic impact comes to 6.2 million rubles a year. The complex is successfully implementing new organizational forms: three interdepartmental laboratories and two creative collectives have been established. The relations with scientific and technical societies of the republic, as well as with the Inzhener Cooperative, which has been newly established in the republic and cooperative with which made it possible in the shortest time to draw up the documentation for a bioenergy unit, are fruitful.

The specification of the priority directions of scientific research and the formulation in conformity with this of programs for the future are the most important task of the department. In the course of this work it turned out that the increase of the level of scientific forecasting is an urgent task, since life teaches us a terrible lesson for our blunders.

The formulation of the programs is being carried out mainly within the framework of all-union programs. The experience of previous years shows that active participation in one all-union priority program or another also ensures a higher level of financing.

For the present much is unclear in the restructuring of the system of the financing of science and, in particular, the financing of republic academies.

The commission for the scientific principles of medicine attached to the department is playing a positive role in improving coordination and complexing in the field of medicine. In 1987 the joint developments (44 themes) of the sectorial scientific research institute of the Latvian SSR Ministry of Health and the Riga Medical Institute

with academic institutes, including such urgent developments for health care of the country as the diagnosis, prevention, and treatment of AIDS, viral hepatitis, influenza, leukosis, and others and the development of preparations and instruments for the treatment of cardiovascular, oncological, and infectious diseases, were expanded significantly.

The all-union programs being presently planned are quite broad and cover the urgent directions, which it is planned to develop at institutes of the department. It is important within the framework of the all-union programs for the institutes not to lose their character and to advance original solutions that are connected with the peculiarities of our region. Thus, the subprogram "Regional Ecology" is being formulated within the program "Biospheric and Ecological Research." It is important that institutes and institutions of not only the biological type of the republic, but also the physical technical, economic, and other types would participate in this subprogram.

Thus, an interdisciplinary approach to the solution of ecological problems is necessary. The fundamental interdisciplinary nature of environmental problems requires the extension of the cooperation of specialists in the field of natural history and social science. In conformity with this it seems advisable to establish at the Latvian SSR Academy of Sciences a research center for ecology, which also realizes the idea of an interdisciplinary approach to the solution of the problems of the protection and rehabilitation of the environment. The center for ecology will work in close contact with the State Committee for the Protection of Nature of Latvia, on the one hand, and with the corresponding centers of the Baltic Region, on the other. The basic task of the center for ecology is the specification of the priority directions of ecological research and the scientific support of the activity of the State Committee for the Protection of Nature.

The point is that traditional ecology and biology cannot effectively solve single-handed the problems that are connected with the pollution of the environment and with disturbances of the ecological equilibrium. It is necessary to develop physical technical ecology, to devise highly sensitive instruments for the determination of pollutants and the functioning of the state of ecosystems, and to know how to measure them quickly, using advanced physical chemical methods and methods of molecular biology and genetics, then we will be able to determine correctly the causes and consequences in the disturbance of the ecological equilibrium and to formulate the corresponding forecasts.

The radical restructuring of nature conservation in the country is planned, which is assigning series tasks to science. In this light it is necessary to make adjustments in the specification of the priority directions of research in the republic and to turn the priorities in the direction of ecology.

At the same time it is necessary to note that the suggestions of the department on these questions did not find their reflection in the document on the long-term development of the Latvian SSR Academy of Sciences, and it is a good thing that the Latvian SSR Academy of Sciences has not yet approved it. Apparently, it is necessary to return to the drafting of the long-range plan of the development of the republic Academy of Sciences, having discussed it in a democratic manner at all levels: from the laboratory to the Presidium and General Assembly of the Latvian SSR Academy of Sciences.

In analyzing the activity of the Chemical and Biological Sciences Department and institutions in light of restructuring, it is necessary to note a number of positive changes in scientific organizational work. However, the conducted certification of scientific personnel has not yielded the anticipated results and the proclaimed new personnel policy still needs embodiment.

In 1987 in addition to the three already functioning scientific educational centers, the educational scientific complex for ecology was established. Laboratories of the Institute of Biology and the Botanical Garden of the Latvian SSR Academy of Sciences and chairs of the Latvian State University imeni P. Stuchka, the Latvian Agricultural Academy, and Riga Polytechnical Institute imeni A. Pelshe, which are carrying out research and the training of specialists in the field of ecology, are a part of it. The assurance of the special-purpose training of specialists for scientific research institutions, educational institutions, and the national economy in the field of ecology is the task of the new complex. The advanced training and the improvement of the skills of instructors of higher educational institutions, scientists, and management personnel of the national economy hold an important place in the work of the complex. It seems to us that it would be proper to suggest to all chairmen of rayon soviet executive committees and city soviet executive committees to take special courses of instruction in ecology with the subsequent taking of examinations, since great rights have been given to local organs of power.

An intensive search for new forms in the organization of scientific research is under way. Temporary collectives have been set up at the Institute of Biology and two have been set up at the Institute of Microbiology imeni Avgust Kirkhenshteyn. However, obsolete scientific organizational structures still exist at the basis of the infrastructure of scientific institutions. As a result of the democratization of management the moral climate at institutes has improved, but the administrative command style is not yet yielding its positions both at a number of institutes and in the staff of the presidium.

The inadequacy of the experimental base of institutes is a serious obstacle to the implementation of scientific ideas, but on this level hardly anything has changed and

there are no clear prospects with respect to the improvement of the scientific process. It is especially necessary to speed up the computerization of the scientific research process and scientific organizational work.

There have been no changes in the increase of the capacities of the Construction and Repair Administration. Nothing has changed with respect to the improvement of the conditions of daily life of associates of the Latvian SSR Academy of Sciences. The situation with housing is particularly bad. Thus far the question of the organization of a polyclinic for the academy and so on has not been settled.

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Speech of CPL CC Secretary

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[Speech by Secretary of the Central Committee of Communist Party of Latvia Ya.Ya. Okherin at the annual session of the General Assembly of the Latvian SSR Academy of Sciences under the rubric "The Annual Session of the General Assembly of the Latvian SSR Academy of Sciences": "The Speech of Secretary of the Central Committee of the Communist Party of Latvia Ya.Ya. Okherin"]

[Text] The success of the strategy of accelerating the development of the national economy of the republic depends first of all on how we accomplish the tasks of scientific and technical progress and in what condition our science—one of the leading and dynamic sectors of the national economy of the republic—is.

The concept of the development of academic science, in which nearly one scientist in five of the republic works, is aimed at the leading development of basic research, the concentration of personnel and material and financial resources in the priority directions for the Latvian SSR Academy of Sciences, and the utmost integration of science with production. It is also necessary to maintain such an approach in the future, by increasing the emphasis on the solution of problems that are vitally important both for our republic and for the country as a whole.

The basic results of scientific activity attest that the collective of the Academy of Sciences completed 1987 with rather good results and made a positive contribution to scientific and technical progress. In the republic the authority of science has increased.

Today we are witnesses to how the process of the technological revolution is developing in the world. The technological revolution is having an influence on many aspects of the activity of scientists and is causing the need for the reform of their thinking. In the questions of the development of new equipment and technology instead of the traditional questions: "What is to be

produced?" and "How much is to be produced?" the questions: "How is it to be produced and at what price?" and "To what consequences in ecology and the social sphere will the introduction of a new development lead?" are coming to the forefront. The demands on the technological directions, which follow from the achievements of basic science, are increasing sharply. The changeover of enterprises to full cost accounting and self-financing is leading to the making of the demands on the economic aspect of scientific developments more rigid. Everything that scientist will proposed will undergo, and in individual cases is already undergoing, more strict technical and economic verification. The sharply increased demands of the republic State Agroindustrial Committee on the careful technical and economic analysis of all the developments, which have been proposed in recent times by scientists of the Academy of Sciences, within the Latvian biotekhnologiya Republic Interbranch Scientific Technical Complex (RMNTK) is a graphic example of this.

It is doubtless that under these conditions the demands on the technologies and technical documentation for developments, which are being transferred for introduction, are increasing substantially. Before the transfer of developments for introduction their more careful checking and finishing at the pilot bases of academic institutes will be required. The importance of pilot bases for the progressive development of science is increasing sharply.

In this connection one should rate positively the work of the Academy of Sciences on the establishment and development in 1987 of the pilot base of the Engineering and Technological Center. By the efforts of the Repair and Construction Administration of the Latvian SSR Academy of Sciences the renovation and retooling of the first section of the Engineering and Technological Center were carried out and the questions of supplying the center with equipment and materials were settled in part. The Engineering and Technological Center in 1987 performed an amount of work worth nearly 1.3 million rubles in accordance with the orders of enterprises, moreover, mainly enterprises and organizations of our republic. The Ministry of Municipal Services, the State Agroindustrial Committee, the Ministry of Motor Transport and Highways, the Daugavpils Plant of Sprocket Chains, and the VEF, Radiotekhnika, RAF, Alfa, and Rekord production associations were the basic clients. The work of the Engineering and Technological Center made it possible to release nearly 80 people. But this, unfortunately, for the present is the only example and just in one of the priority directions (robotics, instrument making, and machine building). A less favorable situation is forming in the other directions.

Scientists of the Latvian SSR Academy of Sciences are working successfully in a large number of priority directions, such as biotechnology and genetic engineering, the development and use of new materials, robotics and machine building, information science and computer technology. At the same time applied research and work

on the use of advanced technologies: membrane, plasma, gas thermal, laser, and radiation technologies, are being carried out. A number of decrees, in which the development of the scientific and pilot bases is envisaged, have been adopted on questions of the development of these scientific directions. At the same time the development and construction of facilities of science and scientific service in recent times have been carried out at an obviously inadequate pace.

It is obvious that we were not able to achieve a change in this matter. For several executives of planning organs of the republic the problems of scientific and technical progress still remain secondary. It is also impossible to recognize as progressive in this matter the position of the Academy of Sciences, which is not displaying proper activity either in case of the development of the capacities of its Repair and Construction Administration, which is being spoken about at various levels not for the first year, or in case of the planning of the volumes of the republic Ministry of Construction.

Let us examine the development of the work in three priority directions, in which republic interbranch scientific technical complexes: the Latvian biotekhnologiya, Latvantikor, and Lokalnyye informatsionnyye seti complexes, have been established. Institutes of the Academy of Sciences are the head organizations of these complexes. The activity of the complexes has been repeatedly analyzed, including at meetings of the party and economic aktiv, therefore, I will state just a few views on their work.

The Latvian biotekhnologiya Republic Interbranch Scientific Technical Complex has to its credit developments, which can and should entail truly revolutionary changes in the national economy of the republic in case of their large-scale introduction. One should group with such developments: the clonal microreproduction of planting stock and the obtaining on this basis of virus-free high-yielding strains of potatoes, as well as the development of a unified system of embryo transplantation for the purpose of increasing the productivity of animal husbandry. Here the necessity of uniting all efforts precisely for the increase of the volumes of introduction, for which the concentration of all the material and technical resources of interested organizations, first of all organizations of the State Agroindustrial Committee, within the republic interbranch scientific technical complex is mandatory, is now appearing in the forefront.

Within the Latvantikor Republic Interbranch Scientific Technical Complex, work is being performed in two basic directions: the protection of metals against corrosion and the use of plasma technology for the application of coatings with high mechanical and corrosion properties.

The thematic exhibition "Plasma Technology for the National Economy" at the Latvian SSR Exhibition of National Economic Achievements tells in quite detail about this direction. It gives an idea of the possibilities of this technology for the synthesis of new materials and for the development of coatings that have high mechanical and anticorrosion properties. The technology can be used when hardening and reconditioning the parts and mechanisms of the most diverse equipment—agricultural, construction, automotive, and textile equipment. This list could be continued. The effectiveness of the technology was checked in nine pilot sections, which were set up in the system of the State Agroindustrial Committee, at the Daugavpils Plant of Chemical Fiber, at the Tsisis Motor Vehicle Repair Plant, at the Riga Pilot Machine Plant, and at the Biolar Scientific Production Association. This technology also conforms to the best world achievements, to which the contract with the Bulgarian Metallokeramika Association, which is being successfully fulfilled by the Institute of Inorganic Chemistry, attests.

While rating this work positively, it is impossible not to note that the area of the introduction of this technology is inadequate. After all, it can be used not only when reconditioning worn out parts, but also when producing new items, which will lead to an increase of their wear resistance and to an increase of the reliability of the equipment being produced. At the same time the interest on the part of industrial enterprises in this technology is not great. Apparently, inadequate attention is being devoted to advertising and information.

In recent years the electronization of the national economy has been assuming particular importance. The development of the work in this direction should lead to the devising of high-performance information hardware for the transmission of various types of information and should become the basis for the introduction of information science in all economic and social spheres, which in the end will make it possible to drastically intensify the development of the national economy. The role, which has been assigned in the work of the Lokalnaye informatsionnyye seti Republic Interbranch Scientific Technical Complex to the Institute of Electronics and Computer Technology, is great. The held meeting of the party and economic aktiv showed the positive aspects of the activity of the republic interbranch scientific technical complex and also cast light on a number of unsolved problems. The Buro of the Central Committee of the Communist Party of Latvia is concerned about the pace of the performance of work on the rapid electronization of the national economy. I would like to see greater activity of scientists in the establishment in the republic of information networks and in the rendering of assistance to enterprises of the republic in the development of automated enterprise management systems, in the development of the work of republic educational methods centers, and in the organization of the production of network components and diagnostic aids for information computer networks.

The inadequate technical equipment and engineering support of the Institute of Electronics and Computer Technology, which should make its own contribution, which corresponds to the present world level, to the development of packet switching facilities, are causing alarm. The accomplishment of the posed task is possible only on the basis of a material and technical base that satisfies the requirements of modern science. Therefore, both the institute and the Latvian SSR Academy of Sciences should take a more active position in matters of supplying advanced instruments and equipment.

While rating as a whole positively the work of the indicated republic interbranch scientific technical complexes as an advanced form of the integration of science with production, still the necessity of increasing the activeness of the head organizations should be pointed out. The efficiency of the work of a republic interbranch scientific technical complex depends on the efficiency of the work of the head organization.

The development of the republic had led in recent years to the appearance of a large number of problems that are connected with environmental pollution. The problems of ecology are acquiring greater and greater importance. It is difficult to overestimate the influence of our academic, VUZ, and sectorial science on the settlement of these questions. It is necessary to give the scientists of the Latvian SSR Academy of Sciences their due—they established the real situation with environmental pollution in the cities of Ventspils, Yurmala, and Olaine and in other local natural objects. As a result of the ecological and economic evaluation of the detail design of the Daugavpilska Hydroelectric Power Plant, which was made by scientists, the decision on halting its construction was made. The establishment at the Institute of Biology of a scientific educational complex for the training of specialists in the field of ecology, as well as the decision of the Chemical and Biological Sciences Department on the organization of the Republic Scientific Research Center for Ecology merit approval. The comprehensive scientifically sound evaluation of the existing ecological state of the republic, the elaboration of measures, a long-term strategy, and the prospects of the development, assimilation, and protection of nature of the region, the coordination of scientific research work on ecology, and the ecological evaluation of plans will be the task of the center. All this is important and necessary. But let us also look at the problem from another angle. The occurring changes in ecology are creating a demand for ecologically harmless technologies. Many problems require their own technical solution. The demands on developments of academic institutes are also increasing. One must not allow the introduction of technologies, which are not ecologically harmless, or without the implementation of the necessary nature conservation measures, as happened in previous years when introducing a number of works of the Academy of Sciences.

In this connection I would like the Academy of Sciences to engage more persistently in the solution of the technological aspects of environmental protection, especially as these directions are not something new for scientists. Thus, the Institute of Microbiology proposed a technology of the neutralization of the waste of stock farms. Some experience in the development of membrane technology for the removal of heavy metals from sewage exists. I would like scientists of the Academy of Sciences to intensify their activity in the area of the development of low-waste and waste-free technologies and the processing of secondary resources, by carrying out the coordination of the contribution of science to resource conservation. The question is that the highly authoritative social activity of scientists in matters of environmental protection would be specifically backed by their scientific developments on the solution of the urgent ecological problems of the republic, that is, functional, scientific activity would correspond to social activity.

Resource conservation and the saving of materials, heat, and electric power are closely associated with ecological problems. Scientists issued a conclusion—the Daugavpilsakaya Hydroelectric Power Plant must not be built. The prospects of the construction in the republic toward the close of this millennium of a nuclear power plant are also arousing serious reflections among scientists (from the standpoint of the protection of the environment against pollution). At the same time, how is the energy problem of the region to be optimally solved? A search for alternative solutions is necessary. In the plans of academic institutes the number of both themes on the search for nontraditional types of energy and concepts of optimum energy consumption should increase. The work on the obtaining of biogas by the microbiological method (here the first models of introduced equipment already exist), on new means of storing thermal energy in underground aquifers, and on the use of solar collectors should be expanded. However, this may also prove insufficient for the further development of the power facilities of the republic.

Under the present conditions of democracy and glasnost, the questions of the theoretical interpretation of the processes, which are occurring in all spheres of life of the republic, are assuming particular importance. This is posing difficult and diverse tasks for social scientists. In spite of the fact that last year the work of social scientists was stepped up noticeably and interesting publications, in which several problems raised by the very course of restructuring are analyzed from principled, class standpoints, appeared, nevertheless complete satisfaction from the results of the work of social scientists does not exist.

The proper dynamism in response to new sociopolitical, economic, and spiritual phenomena is often lacking. There are not enough statements in the mass media on questions of the spiritual life of society and historical and moral problems.

The research on the urgent problems of history of the era of socialism, national relations, and the development

and functioning of Latvian-Russian bilingualism should be intensified. It is necessary to continue, as, for example, scientists of the Institute of History are doing, the truthful and complete analysis of all the pages of the history of the building of socialism in the republic.

I would like particularly to stress the necessity of stepping up research in the field of the economic sciences. The reform of the economy, which is now under way, requires reliable scientific support. Such questions as the elaboration of thoroughly scientifically sound prospects of the socioeconomic development of the republic and the efficient distribution of productive forces and the topical problems of the functioning and development of cost accounting are acquiring urgency. Economic science should have a more effective influence on the elaboration and making of all decisions on questions of the development of the national economy of the republic.

Restructuring in science is first of all a resolute change in the work with staffs of scientists and the vigorous promotion of young capable, talented scientists.

The times require that the Academy of Sciences, the higher school, and industry jointly perform the work connected with personnel. The practice of establishing educational scientific production complexes in the most important directions of science merits a positive rating. In these complexes student youth directly acquaint themselves with large-scale science and acquire the skills of research work.

The work on the establishment of temporary youth creative collectives should be stepped up, the presently existing isolation between the academy and the higher school of the republic in the matter of training personnel should be persistently fought.

In the matter of training personnel, it is important to expand cooperation with the academies of sciences of the fraternal republics. Mutual cooperation in the training of personnel, in addition to purely scientific importance, is of great political importance.

The party committee and the party bureaus of the scientific organizations of the Academy of Sciences should strive more vigorously for the intensification and expansion of the restructuring processes in science. For this purpose it is necessary to lend the entire system of work with scientific personnel a truly democratic nature. The prime task of the party organization is to thoroughly activate the person in science and to increase his civic responsibility for the quality of his labor.

The efforts of all scientists of the Academy of Sciences should aimed at seeing to it that science would become more and more a genuine productive force of Soviet society, which has embarked on the path of qualitative revolutionary changes.

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Discussion of Presidium's Activity
18140007 Riga IZVESTIYA AKADEMII NAUK
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[Article under the rubric "The Annual Session of the General Assembly of the Latvian SSR Academy of Sciences": "The Discussion of the Results of the Scientific Activity of the Academy and the Work of Its Presidium in 1987"]

[Text] Corresponding Member E.E. Lavendel, rector of Riga Polytechnical Institute imeni A.Ya. Pelshe, devoted his statement to the contact of the Academy of Sciences with higher educational institutions of the republic.

The problem of the integration of academic and VUZ science is very urgent. The new means of financing science are a lever, which makes it incumbent to ponder significantly more seriously over the real uniting of scientific forces. It is natural that in the specification of state orders with respect to basic science the decisive word belongs to the Academy of Sciences.

At present the so-called coordination of research is carried out according to the following arrangement. The worker-performers gather information. The sum, the summary of this gathered information is also the coordinating plan. It is possible to imagine that the department of the Academy of Sciences should undertake the actual coordination. However, this is not that simple. The point is that at the Academy of Sciences VUZ science is represented very little. Among the members of the academy only four people represent the Latvian State University and Riga Polytechnical Institute. Of course, they cannot encompass everything that must be represented on behalf of the higher educational institutions. There are a large number of scientific councils attached to the departments of the Academy of Sciences. However, scientific councils are public organs. Very often the people, who in reality allocate financing, even do not know the decisions of the scientific councils.

What solutions is it possible to suggest instead of the existing system? It is possible to establish a scientific association made up of a number of higher educational institutions and academic institutes for the solution of strategic problems in the basic and applied sciences. The managers form a "directorate," which works under the supervision of the Academy of Sciences. The directorate also settles all questions. In particular, a sore question is the use of equipment.

It is possible to cite an example. Now Riga Polytechnical Institute has come forth with the suggestion, and the Academy of Sciences supported this, to establish within the polytechnical institute the Institute of Machine Building. From the Academy of Sciences the Institute of

Polymer Mechanics and the Engineering and Technological Center are directly interested in this matter. Not only questions of the allocation of financing, but also such important questions as the fulfillment of state orders and the ratio of basic and applied research and other questions will be settled.

A large misalignment exists in the training of scientific personnel. The majority of scientific research is conducted at the Academy of Sciences, the training of personnel is carried out at higher educational institutions, starting with the undergraduate years. Now the higher educational institution has the right with respect to separate specialties to carry out training in accordance with individual plans. Higher educational institutions have acquired the right to conduct for the most talented people extended training for 5-6 years. The largest number of places in graduate studies once again are at higher educational institutions. The incorrect tendency, when the higher educational institution believes that it is training graduate students only for itself, is appearing here, too. Doctoral studies have also been introduced, and once again at higher educational institutions. Now the Latvian State University and Riga Polytechnical are each already training as many doctors as the Latvian SSR Academy of Sciences.

Corresponding Member E.E. Lavendel also directed attention to the fact that the possibilities, which exist in the exchange of scientists with other countries, are being poorly used. The foreign partners, capitalist countries, are very interested in the results of our basic research. It is necessary to know how to make use of this.

Corresponding Member of the USSR Academy of Sciences Yu.S. Urzhumtsev, deputy academician secretary of the Physical and Technical Sciences Department, devoted his statement to the problems of the Engineering and Technological Center of the academy.

The experimental base, which was established in the system of the Latvian Academy of Sciences back in the middle of the 1960's, during the years of stagnation was not developed, became obsolete, and needs substantial modernization. Design and technological organizations make their quarters in premises, which have not been adapted for production, and are dispersed among many sites. All this had the result that the design and experimental base of institutes was capable of producing only single specimens or even only operating mockups of technical innovations, which were developed on the basis of basic research. The duplication and the production of small series of new instruments, devices, and automation equipment immediately lead to the delay of subsequent developments and hinder basic research and, consequently, its practical implementation. The Engineering and Technological Center was organized to correct the situation. To gain time the center was established on the material base of two independent cost accounting organizations, which are financed through the system of scientific service: the Central Intersectorial

Design and Technological Bureau of Robotics of the Institute of Physics and the Special Planning and Design Bureau of the academy. The tasks of studying the needs of the region for new technical and technological developments and, on the basis of basic research of the Academy of Sciences, higher educational institutions of the republic, and other scientific centers of the country, of carrying out the development and devising of new technological processes, automation equipment, instruments, and materials and of producing small series for the national economy of the republic were set for the center.

Since the establishment of the center 2 years have passed. A pilot works and new structural subdivisions have appeared within it, the volume of work has increased by more than twofold, and it is already possible to draw several conclusions.

The very idea of establishing an interdepartmental engineering and technological center as an academywide introducing organization, which is directly subordinate to the Presidium of the Academy of Sciences, is non-standard. The center brings up to practical implementation the basic developments of various institutes of the physical technical and chemical type, while the final product is used in many sectors of the national economy of the republic. This led to the polytechnical structure of the center, which includes several special design bureaus and design and technological bureaus with a single pilot works. The specific structure of the center should be flexible and should be formed on the basis of the peculiarities of the scientific reserve and the needs of the machine building and instrument making complex of the republic.

The most important developments of the Academy of Sciences and higher educational institutions of the republic dictated the program of work of the Engineering and Technological Center for the current and next five-year plans. The program includes 10 main scientific and technical directions, each of which in turn unites a number of developments. With respect to the structure of the developers the Academy of Sciences provides 86.6 percent of the new equipment, higher educational institutions of the republic provide 11.1 percent, the contribution of other scientific centers of the country for the present is small—2.3 percent. The commission of the Presidium of the republic Council of Ministers for questions of the acceleration of scientific and technical progress made the decision on the fivefold increase of the amount of work of the center by the end of the five-year plan, otherwise a large portion of the scientific developments of Latvian scientists will never attain extensive introduction.

The implementation of this decision requires the further development of the center as an independent cost accounting organization that has the rights of a legal entity. This is one of the most difficult questions, to which all the changes of the very mechanism of introduction can be reduced.

When developing experimental technological processes and new materials, instruments, and equipment on the basis of the results of academic and VUZ research, the engineering centers, special design and technological bureaus, and other introducing organizations carry out their activity on a cost accounting basis in accordance with the orders of interested enterprises. However, by having strict limits on the wage fund, the engineering centers and special design and technological bureaus do not have the opportunity to increase the amounts of work for the national economy without numerous additional consultations.

If production is interested in innovations and is willing to pay for their implementation, it is necessary to eliminate the limits on labor for special design and technological bureaus and engineering centers, for this prevents the large-scale introduction of new equipment and technology. This will not do harm to the commodity-money circulation, for the share of experimental introducing organizations does not exceed a tenth of a percent of the total number of personnel of the machine building complex. It is necessary to reject resolutely the dogmas of past times and to establish the standards of the wage of academic design and technological organizations and engineering centers not from what has been achieved, but subject to the amount of economic contractual work.

A psychological change has now occurred in our interrelations with Latvsnab. It would be good if the republic State Planning Committee also did not keep aloof from the problems of supplying the center with equipment, computer hardware, and materials. The Engineering and Technological Center is first of all a republic introducing organization; to aid the formation of the center means to aid the increase of the scientific and technical progress of the entire national economy of the republic.

In conclusion Corresponding Member of the USSR Academy of Sciences Yu.S. Urzhumtsev stressed that the basic specialization of the center is the automation of machine building of the republic and its electronization. From this standpoint it is advisable to merge the center of rotary lines with the Engineering and Technological Center. This will increase the professional level of the rotor center and will make it possible to solve the problems of the automation of industrial enterprises of the republic collectively, from a common methodological standpoint.

Candidate of Technical Sciences G.G. Gromov, secretary of the party organization of the Institute of Electronics and Computer Technology, in his statement spoke about local computer networks. He stressed that the present level of automation in various spheres of science and production is based on the use of local and territorial information computer networks.

The Lokalnyye informatsionnyye seti Republic Interbranch Scientific Technical Complex (RMNTK) was established for the purpose of creating the necessary

conditions for the assurance of a modern level of the automation of enterprises and organizations of our republic. The complex united 11 enterprises and organizations of the republic, which have the necessary potential for the performance of the entire range of network development—from scientific research to turnkey introduction.

At the Institute of Electronics and Computer Technology research on the theory of open networks is being conducted, a series of hardware and software for a wide range of local area networks has been developed. Development was performed with allowance made for international standards.

At the initial stage of its activity the republic interbranch scientific technical complex is carrying out the development and industrial assimilation of network aids at enterprises and organizations, which are most ready for the assimilation and introduction of network aids. These enterprises have the necessary computer hardware, are interested in the introduction of network methods and in the automation of production activity, and have a production base for the manufacture of network equipment.

Today a nodal network at the Latvian SSR Academy of Sciences and an operating network of computers with packet switching, in which the computers of the Institute of Electronics and Computer Technology, the Institute of Organic Synthesis, the Institute of Wood Chemistry, the Institute of Economics, and the Scientific Research Institute of Planning of the Latvian SSR State Planning Committee have been included, have been developed by the forces of the republic interbranch scientific technical complex. The linking up of the computers of the Institute of Microbiology, the Institute of Inorganic Chemistry, and the Main Library is planned.

The delay in the linking up to the network of the computers of all institutes of the academy is due to the lack of the necessary computers. As to network communications hardware, it is being series produced in Moscow at the Energopribor Plant and there is no problem in supplying this work with it. The supply of the work with computer hardware is poor. Today the Supply Administration of the USSR Academy of Sciences in Moscow did not give an answer to which of the ordered computers will be supplied.

The second important job, which was completed by the forces of the complex, is the local area network that is operating at School No 20 of Riga. By the end of 1988 it is envisaged to introduce another four local area networks based on microcomputers.

A prototype of a network microprocessor adapter has been developed. There is confidence that the entire need in the republic for this important network component will be met.

The republic interbranch scientific technical complex is operating under the new economic condition (on a cost accounting basis), all the jobs for the most part have been completed in accordance with economic contracts.

However, not all the members of the republic interbranch scientific technical complex have actively joined in the work on the program. The Etalon Plant, for which work has been planned on the production of network measuring complexes for the checking of product quality, is not participating. The production of network aids and networks is of an individual nature. The production of hardware and networks is being carried out in accordance with economic contracts only for the producers' own needs. Only the VEF Association is preparing for series production. Today there exists for the present a wait and see position of republic enterprises, which could be the users of network aids.

The educational methods center should provide assistance in seeing to it that enterprises would understand the economic expedience in the use of networks in production activity. The organization of such a center is an important task of the republic interbranch scientific technical complex. Precisely here it is possible to tell and show the enterprise how it is possible and necessary to work with the network, with allowance made for individual needs. As was noted in the resolution of the meeting of the party and economic aktiv of the republic interbranch scientific technical complex, the establishment of such a center involves the solution of a priority problem—the development of the experimental base. Directive organs of the republic should provide assistance in the accomplishment of this task.

The statement of T.N. Miller, director of the Institute of Inorganic Chemistry, was devoted to a number of problems that face institutes.

As practical experience shows, the worse premises are always made available to the Academy of Sciences. At one time, when the Institute of Inorganic Chemistry was beginning research in the field of plasma chemistry, they turned over to it premises that no one needed, and so it continues. At present this is again visible from the example of the Antikor Experimental Design and Technological Bureau and the Engineering and Technological Center.

The problem of the interrelations between institutes and special design bureaus (including the Engineering and Technological Center) at the next level seems urgent. Now institutes transfer their developments to special design bureaus free of charge, without requiring any remuneration. At the special design bureaus experimental production is organized and there they receive from clients a fee or other. Under the new conditions of management, obviously, special design bureaus will try to provide their volume of work with the most profitable orders. This is understandable. But new developments, the further evolution of which it is also necessary to

ensure, also exist. Under the new conditions of management the institute should receive for its developments contributions to its material stimulation and social development funds. It is natural that this problem is also urgent for other institutes.

A large group of problems is connected with social questions. The housing problem has already been spoken about here. One associate of ours has been waiting in line as a young specialist not 10 years, but already 20 years. Therefore, the question of building dormitories in Salaspils or Riga is very urgent. Only then will it be possible to settle the question of the replacement and the reduction of the age of personnel at institutes.

Many problems face the institutes that are located in Salaspils. At present there are already more than 20,000 inhabitants in the settlement, but Salaspils is considered a village, with all the consequences and trends. These are the questions of supply, since the stocks of products are small, this is the establishment of telephone communications. Due to the lack of capacities of treatment facilities it will be impossible to turn over any of the objects being newly put into operation.

G.P. Andrushaytis, director of the Institute of Biology, devoted his statement mainly to questions of ecology.

In the republic the change of ecological processes is occurring very rapidly. About 10-15 years ago it was possible to believe that the republic was in a good ecological situation, now this situation is already tense, in connection with the development of its own industry, as well as under the influence of neighbors. According to biological indications the situation in a number of rayons of the republic, which are industrially underdeveloped, is even worse than in the environs of Riga. Therefore, one of the most important tasks of science is to evaluate comprehensively the status of the republic, to formulate biological and other measures, to develop a scientifically sound system of the improvement of environmental protection, and to formulate measures on the efficient use of natural resources. It is necessary to develop standards for each region.

Important decrees of the party and government on nature conservation—on both the all-union and the republic scale—have now been adopted. As to our republic, it is very important that the activity of the Committee for the Protection of Nature, which is being established, would rely on science. The dispersal of scientific forces is disadvantageous. If we speak about the study of regions, such sciences (which are not represented at the republic Academy of Sciences) as geography and geology are very important. At one time the Institute of Geology existed at the Latvian SSR Academy of Sciences, but they eliminated it—they believed that it would work successfully as a part of the All-Union Scientific Research Institute of Marine Geology and Geophysics.

However, it is now evident that at this institute republic geology is not being taken into account. The time has come to return these geologists to the Latvian SSR Academy of Sciences.

If the ecological situations are not taken into consideration, it is impossible to hope for an increase of agricultural products, especially the increase of the yield of cereal crops. In Holland, Belgium, and Denmark the yields of cereal crops as a result of "acid" rains have decreased by 10-12 quintals per hectare. This also threatens us. But we are not at all developing so-called agricultural ecology. There are a large number of problems here, which it is necessary to study and solve in order to ensure the fulfillment of the Food Program.

Ecology should support the living conditions of man. However, in the republic there is now no such science as medical ecology. In the world and in the USSR this science is being developed, in the republic it is not. Medicine itself is well developed in the republic, but only one medical worker is working in the field of medical ecology—he is studying the state of health of children in Olayne. We have 65 themes on nature conservation, 25 organizations are participating, but medical personnel, in spite of repeated appeals and invitations, are remaining aloof.

G.P. Andrushaytis also dwelt on questions of construction in the city of Yurmala. He pointed out the difficulties, which scientists are experiencing as a result of the poor supply of the necessary equipment and computer hardware. As to the committee for the protection of nature, which is being established, all resources, absolute control, and the opportunity to finance research should be in the hands of this committee.

In her statement Corresponding Member of the Academy I.K. Apine, a professor of the Latvian State University imeni P. Stuchka, spoke about the study of national processes.

The questions of national relations have become more urgent. It is necessary to conduct the study of national relations in a professional manner, at a high level, and without dilettantism. Comprehensive, coordinated work is necessary. There is not one field of science, which could monopolize the study of national relations. It is possible to expect success, if there is a comprehensive approach from various aspects—the socioeconomic and the demographic, while enlisting history, ethnography, philosophy, law, and linguistics.

Now studies of these questions are being conducted at practically all the institutes of the Social Sciences Department of the Academy of Sciences. At Riga Polytechnical Institute research is being conducted in several chairs. At the Institute of Party History it is planned to establish a sector for the study of national policy. At the Latvian State University research is being conducted in

the chairs of party history and history of the USSR. Economists are actively studying demographic problems, there is research in the geography faculty.

Thus, there are several institutions and several collectives. It is impossible to say that there is no coordination, there are common measures and there are joint, uniting operations. At the Zinatne Publishing House "The Historiography of National Relations" is being prepared, true, with great difficulties. A terminological dictionary on national relations, the second edition, is being prepared at the Avots Publishing House. The collection "Social Processes and National Relations" has been published at the Zinatne Publishing House, works of economists, demographers, philosophers, and historians are united in it. However, the uniting center, however strange this would seem, is now the republic Society for Knowledge. But lecturers and propagandists have united there and research goals are not the main ones there.

An important task is the study of the history of the Latvian nation over the course of several formations. It is a question not only of capitalism and socialism, but of the entire ethnic history. The history of the Latvian

socialist nation has not been described at all. Jointly with lawyers we are still studying the questions of the stages of the establishment of the national state system; no complete coincidence of opinions exists here. We inherited very much in national relations from the past, and this past legacy is not completely clear. The legacy of tsarist Russia, long cultivated national hostility, antisemitism, and difficulties in the history of Transcaucasian peoples—it seems that the root of many current phenomena lies in this. The violations of legality under the conditions of the personality cult also played their role. Only by having studied the past is it possible to substantiate scientifically today's national policy. And there is something to study in the history of the republic of the past 25-30 years—the use of language and the evaluation of the cultural legacy. In conclusion Corresponding Member I.K. Apine directed attention to the fact that a coordinating center, which could be under the Academy of Sciences, for studies of national relations is necessary.

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7807

Baklanov Visits Troubled MNTK 'Rotor'
18140018a Moscow IZVESTIYA in Russian
7 Aug 88 p 3

[TASS article: "More Attention to Automation"]

[Text] One of the promising directions of raising production efficiency is wide-scale introduction of rotor and rotor-conveyor lines which can equally successfully operate in machine building, in the food and medical industries in the production of consumer goods and in other sectors by provided comprehensive automation of production processes and a significant increase in labor productivity. A leading place in carrying out this work is occupied by the design bureau of automatic lines—the head enterprise of the Rotor Intersectoral Scientific and Technical Complex located in Klimovsk of Moscow Oblast. On 5 August this near-Moscow enterprise was visited by CPSU Secretary O.D. Baklanov.

Academician L.N. Koshkin, the general director of the intersectoral scientific and technical complex, described the work of the complex in further expanding the use of rotor technology, developing the necessary laboratory, design and production base and developing and introducing new types of rotor lines.

The secretary of the CPSU Central Committee looked over the existing comprehensively-automated production of mass-produced items on the basis of rotor-conveyor lines and acquainted himself with examples of new equipment. Attention was drawn to the intolerably long time required for the development of this progressive equipment. The developers were subjected to sharp criticism for slow development of the work relating to creation of rotor lines and components for making one-time medical syringes so needed by health care.

In a conversation with workers and engineering and technical personnel, O.D. Baklanov displayed an interest in the progress of perestroika, how food and social problems are being solved and what is being done in the collective on fulfilling the decisions of the July CPSU CC Plenum.

In his concluding talk with management and specialists of the head design bureau, the need was stressed of a radical improvement in the work of the intersectoral scientific and technical complex on the creation and introduction of rotor and rotor-conveyor lines in the national economy. Practical measures were outlined for ensuring the fulfillment of set targets. Tasks were set for the accelerated solution of the pressing problems of the collective's social development.

B.L. Tolstykh, the deputy chairman of the USSR Council of Ministers and chairman of the USSR State Committee for Science and Technology, USSR ministers P.V. Finogenov, V.G. Kolesnikov, N.A. Panichev, V.A. Bykov and other party and economic leaders were present with O.D. Baklanov.

**Academician Calls for More
Emphasis on Human Problems Research**

18140319c Moscow NTR: PROBLEMY I RESHENIYA
in Russian No 12, 21 Jun-4 Jul 88 p 7

[Article by V. Kaznacheyev, director, USSR Academy of Medical Sciences Siberian Department Institute of Clinical and Experimental Medicine, USSR Academy of Medical Sciences academician: "Returning to Man"]

[Text] October [Revolution] was accomplished for the sake of man—the object and subject of a new history. However, after V.I. Lenin's death the sociopolitical accents gradually changed and an administrative-punitive regime prevailed. Lenin's behests on humanism were distorted and, above all, the humanist principle of domestic culture and science was eradicated. A time of degradation, stagnation and scientific genocide began in sociology, history, demographics, biology, psychology—in the study of man. Why is the science of man needed, if the population of the country of a gigantic authoritarian machine has been converted into obedient servants? What are these sciences good for, when a new faith, that of a great but one-faced people in a great and wise leader, is needed?

When the Great Patriotic War—the world-wide struggle between the forces of good and evil—ended with the great victory of humanism, it seemed that the thinking of the nature of man would finally be revived from the ashes. However, this did not occur: the force of the administrative regime restored scientific genocide. I will not repeat the names: the press is opening the work of this terrible dungeon for us every day. The study of man continued to be annihilated and was replaced by the principles of command sociology. The scientific problems of man, in all of his hypostases, essentially disappeared from USSR Academy of Sciences programs. The Academy of Medical Sciences and its institutes, along with the Minzdrav subdivisions, were converted into a gigantic, ineffective repair and treatment "factory." Its leaders ignored basic research into the nature and evolution of health and its long-term prognoses. Thus, the technocratic system created a gigantic slant in the domestic natural sciences and in scientific thinking on the whole. It was very easy to pin the label of pseudoscience or, at best, of an unpromising nature, to everything which did not fit into its framework.

For example, an attempt to create a scientific organization in Siberia on the comprehensive problems of man, based on basic health research with the accelerated implementation of results in practice, ended sadly. This was needed, in particular, for the mastery of new territories in the country's East, when the "cheap" camp system had definitively compromised itself. The young branch of the USSR Academy of Medical Sciences in

Novosibirsk, the work directions of which were supported by scientists such as Academicians M.M. Lavrentyev, A.L. Yanshin, A.A. Trofimuk, A.G. Aganbegyan and others, was converted into the USSR Academy of Medical Sciences Siberian Department in 1980, on the authority of the USSR Academy of Medical Sciences Presidium and Minzdrav, and was forced to copy the purely treatment and diagnostic tasks of Minzdrav and the medical academy. They narrowed its task into that of a good treatment "shop." The Eastern region of the country remained without advanced studies of the foundations of health and prevention. Not even the most expensive diagnostic centers, new hospitals or polyclinics can make up for this.

Moreover, in the same year, the union scientific council on the problems of man's adaptation, which had successfully combined studies of the problems of man in different regions of the country (the North, the desert, high mountains, oceans, cities) was also eliminated. A corresponding union scientific program was re-emphasized. Now, this very important problem of the health of healthy people is scattered throughout the subdivisions of the USSR Academy of Sciences, USSR Academy of Medical Sciences and other departments. Naturally, given such "logic," there can be no comprehensive approach to its solution. Yet, after all, the keys to understanding man's contemporary evolution, his genetics, phenotype and chronic stress, lie in this problem.

These examples show that, to this day, the problems of man remain in "no man's land." What does this lead to? For instance, the present condition of the social labor potential of the native population in the Eastern territories of the country, in newly settled zones is cause for alarm. Irreplaceable medical, social and demographic losses (chronic diseases, disability, mortality, uncompleted pregnancies, divorces, etc.) comprise about 5 percent annually here.

As Academician T.I. Zaslavskaya has already written, this is the alarming beginning of the processes of depopulating the native population of the country's East. Twice, I have sent notes to the RSFSR Council of Ministers on this subject and twice, unfortunately, they have not been given attention, returning back through RSFSR Minzdrav. Evidently, the problems of man are being viewed narrowly, as purely medical, by the republic government. However, the economics of man, without combining labor-intensiveness with human-intensiveness, or to put it in other words, with the quantity and quality of human resources both today and tomorrow, cannot be a reliable criteria for social health.

Technocratic convictions have gone too far: they have become a way of thinking for many party, soviet and scientific organizers. Thus, a council of the problems of the biosphere in the USSR Academy of Sciences Presidium has ceased working. In its new ecological program, the USSR Academy of Sciences is planning many studies on the surrounding environment and nothing on that

which is most important—the nature of man, his increasing needs and his evolution in a new humanistic world. The external environment, biosphere, and ecology will rely on the already-known norms for man's living requirements. The technocratic principle has prevailed again, true, at a new level, that of the so-called ecological imperative, which is somehow being passed off by certain leading theoreticians as the quintessence of V.I. Vernadskiy's teachings on the biosphere-noosphere.

It is also impossible to overlook the fact that some of our officials are in no way divorcing themselves from the "Soviet is the very best" dogma. Consequently, an artificial curtain is created for the science of the West and promising new methods for the treatment, control and improvement of health (for example, psychotronics) are being rejected.

Thus, in my opinion, if we support restructuring and its revolutionary course, a revolution in the culture and sciences of man is also needed. After all, when we say "restructuring, democracy, humanism," we refer primarily to man. Why does the science of man to this day remain in the murky shadow of administrative technocracy and stagnation? We need an Institute of Man and programs in human studies which would include, in addition to philosophical and sociological investigations, the basic study of the physical and psychological health of people. As a participant in the Great Patriotic War, a doctor, scientist and communist, I expect solutions to this problem from the party conference.

13362

Decentralization, More Freedom for Scientists Urged

18140327a Moscow LITERATURNAYA GAZETA
in Russian 22 Jun 88 p 13

[Report by L. Zagalskiy and V. Sharov, Vladivostok: "How to Stand Straight at Attention"; first five paragraphs are source introduction]

[Text] The party faces a difficult task—to bring the country out of stagnancy, to put the economic situation into a healthy state, to bring development around for the well-being of the people, to work out and implement a complex of measures of a long-range character in order to ensure rapid emergence in the front lines of world scientific-technical and economic progress.

Society has reached the position where a significant breakthrough is needed in all directions of the natural, technical and social sciences. The USSR Academy of Sciences is called upon to make an increasing contribution to this."

Party organs have started more and more to undertake the direct solution of current problems of economic and administrative management, replacing the soviets and other state organs.

The aim of perestroika is to fully reveal the humanist nature and creative power of socialism. The attainment of this aim is inseparable from the development of democracy, glasnost and self-government of the people.

[Preceding four paragraphs are extracts from the Theses of the CPSU Central Committee for the 19th All-Union Party Conference]

Soviet science is the most advanced in the world. This idea to which we have become accustomed from way back offends the ear today. Glasnost has winnowed out the chaff of ostentation, and it has become clear that we are drastically lagging behind. What are the real ways of restructuring Soviet science? A round-table discussion took place conducted by the paper at the Far Eastern Department of the USSR Academy of Sciences. The following took part in it: I. BREKHMAN, doctor of medical sciences, professor of the Pacific Ocean Oceanological Institute; V. VASKOVSKIY, doctor of biological sciences, chief scientific associate of the Institute of Marine Biology; V. GLUSHCHENKO, corresponding member of the USSR Academy of Sciences, deputy chairman of the Far-Eastern Department of the USSR Academy of Sciences; S. GOVORUSHKO, candidate of geographic sciences, laboratory chief of the Pacific Ocean Institute of Geography; the poet Yu. KASHUK; I. KOCHUBIYEVSKIY, doctor of technical sciences, professor of the Far-Eastern State University, chairman of the Effect Scientific-Research Cooperative; A. LATKIN, candidate of technical sciences, sector chief of the Institute of Economic and International Problems of Oceanic Development; S. OLENIN, candidate of philosophic sciences, chief of the Department of Science and Educational Institutions of the Maritime Kray CPSU Committee; A. CHIGIRINSKIY, candidate of biological sciences, leading scientific associate of the Pacific Ocean Scientific-Research Institute of Economy and Oceanography of the USSR Ministry of Fish Industry.

I. BREKHMAN: Perestroika has been going on for 3 years in the country, but the impression created is that it has not even touched science. As before, its development is understood to mean the creation of new large institutes while the institutes themselves are being transformed into one-actor theaters. Without a doubt such theaters must exist, but there cannot and there must not be a one-director institute.

At present everything is topsy-turvy. The best brains of an institute (they form the scientific council) cannot decide on anything without the director, who has a monopoly of power, which means it is unlimited. What sort of a state of affairs this will lead to can well be seen from the last 20 years.

It is essential to give freedom to the scientist. Let the department head himself propose a program of work, receive finances for it and then publicly defend it. (It would be something in the manner of so-called grants. I was recently in the United States and there acquainted

myself with this system.) After a certain amount of time, the head of a scientific group reports back to the scientific council: they discuss the matter, go into mistakes and plan further work.

It is time for perestroika to begin not only from the top but also from the bottom.

I. KOCHUBIYEVSKIY: Indeed the scientist's hands and feet are swaddled like a baby's. Any independent action evokes the chief's cry: "It is not allowed!"

I recall a verse:

They ask a demanding question: "How do you stand straight at attention?" Well, it is quite impossible to do anything. Nor is it possible to do something wrong.

This brief four-liner defines all the woes of science. We are lagging, and today only the sound remains of the drumming which our scientific achievements have always been accompanied by. True, Munchhausen might have frozen it, but he, unfortunately, took this "scientific" secret with him.

I pose a question to everyone present: who determines what a trivial theme [melkotemye] is? It is necessary, as they say, to know the face of the enemy, since we curse it from all rostrums (especially party rostrums), boasting that we have smashed trivial themes.

V. GLUSHCHENKO: Trivial themes exist in science. It is all a matter of how deeply you dig. Any minor theme can be made out to be a global one, and it is possible to do the opposite.

I. KOCHUBIYEVSKIY: Judging by the speeches from the highest government rostrums, a trivial theme can be defined thus: it is a problem that has not been approved by the highest authorities, it does not operate with a large collective and it does not require a large outlay of money. Examples of persons producing trivial themes: Einstein, Mendeleyev, Poincare. Now tell me what enterprise would have ordered today from Mendeleyev his table, concluded an economic contract, paid him money and in general accepted a two-page long report?

There are no trivial themes in science. If you wish, trivial results occur. But they do not depend on the number of millions spent or on the size of the collective. Gigantic scientific-production associations (NPO) were created. They promised quick results in machine building. Where are they? Where is the Don combine? A year and a half have already elapsed. Numerous examples could be cited.

Here is another problem. So-called venture firms exist abroad. They reimburse risk when it is not known whether the scientists will obtain a result. We for some

reason have to include in the plan of scientific development only that which has long been known. Where then is science? Who will assume the risk?

We need to reject scientific planning in the form it is being carried out today and reject special-goal programs which are always created under a big scientific person. A student could be effective, and it is not at all necessary for one to be an academician. Past services of certain academicians have been great, let them be paid 500 rubles for a job, I am not complaining. But first and foremost it is necessary to pay for the result.

I am the chairman of a scientific collective. With us it does not matter. We pay only for work, and not for the title which the performer possesses. This is how it should be everywhere.

V. VASKOVSKIY: Today world basic science, Soviet science and the national economy are practically unconnected. It is quite reminiscent of a story, but it is not a funny, but rather a sad story.

What is basic scientific work as we understand it? Well, quite simply: you look at what world science is doing (there, of course, where you are capable of comprehension by virtue of training and the presence of talent). You find in it some sort of flaws and cracks, you introduce your own contribution and build it once more into a world science.

What does this require? Information, conditions for the operation of thought, instruments and tools. Everything is important. But most important of all is information.

A year ago, I carried out the following analysis. I took 200 of the most important scientific journals for all of the basic specialties. I decided to check how many of them were on the shelves of the country's largest scientific centers. It turned out that outside of Moscow and Leningrad, they were to be found on the average in five to 10 libraries. An even sadder picture exists in regard to publications reflecting new scientific trends. Of 50 journals, one-third did not prove to be in the country.

We simply do not know what is going on in world science!

All the scientific journals published in the world can be rated on the basis of two criteria: on the basis of general citation (the journal as a whole) and on the basis of citation of each article.

Here is the situation for 1988. On the basis of general citation, DOKLADY AN SSSR is 103rd and ZHURNAL EKSPERIMENTALNOY I TEORETICHESKOY FIZIKI is 117th on the world list. And yet these are the journals that present our traditionally advanced research. If we were to use the second criterion—article

citation, then DOKLADY would have to be moved back to 2,745th place. In this location are to be found the least current journals published in the world.

What sort of "advanced position" can one speak of here? Our Institute of Marine Biology also has a publication of its own. The articles in it lie around for 3 (!) years. For this reason is it necessary for a scientist to hurry? Why should he hurry? In 3 years everything will have become obsolete anyhow!

A. LATKIN: Of the 100 indicators at the disposal of scientific statistics, only one indicates effectiveness of scientific research. And it is quite conditional.

In many capitalist countries, a forecast is first made regarding the problems to be solved in the next 20 years. Then the level of technical potential needed for the solution of these problems is determined. With us everything is the other way around: first the number of people and amount of funds and only then the problems that need to be solved.

Quite intolerable is the fact that science is that sphere where the larger part of information is classified. You cannot publish a report (Kraylit [Kray Literature Department (?)]) takes out all the figures), nor can you present a report.

VOICE FROM A SEAT: The CIA knows these figures.

A. LATKIN: The CIA may know. We do not know. It is possible to read an information report on how science is organized in China, in Hungary, on the Seychelles Islands, but not how it is organized among us.

S. OLENIN: I recall an elegant expression of Gorkiy: science is our epoch's nervous system. Perephrasing it, you get that science is the nervous system of our perestroika. The fact is that all social and economic changes (this incidently is stressed in the Theses of the CPSU Central Committee) take place through achievements of science.

Today much is being said about management. One can and must raise the question of the need of party management of the structural subdivisions of science. Specifically, is a department of science and educational institutions of the kray party committee necessary? I believe that such departments in kraykoms and obkoms need to be strengthened rather than eliminated. It is also necessary that they include not only the academic but also the sectoral.

I. KOCHUBIYEVSKIY: Scientists have the following idea—elimination. Let us employ it in our case. What would have happened if the kray party committee did not have a department of science?

S. OLENIN: It is not necessary to rely on destruction. But we need to take into account that everything changes with the destruction of some mechanism. The future is built on the past. Science departments have definitely proved themselves. This can be judged by those who come in contact with them.

I. KOCHUBIYEVSKIY: But you did not answer the question. What in any case would have happened to science if the party kraykom did not have a science department?

S. OLENIN: I see no sense in answering such a fantastic question.

I. KOCHUBIYEVSKIY: All right. Then let us once more put the question in another way. Name whatever problem you wish—I ask that you point out a scientific rather than an organizational one (appointing or removing someone)—that the department of science succeeded in solving.

S. OLENIN: We help in solving practically all problems connected with the material and technical base. We submit them to the buro. We concern ourselves not only with people but also with conditions in which they live and work. We do not have another level where decisions are made.

I. KOCHUBIYEVSKIY: The kraykom is not at all interested in the scientific qualities of a worker—only in his social character. What sort of public work he does and whether he shirks visiting the vegetable base. But there are also fanatic scientists who do an excellent job but are poor specialists in the area of sorting potatoes.

S. OLENIN: Let us not build an entire edifice on isolated cases.

A. CHIGIRINSKIY: Science is not only unmanageable, it is—and I will frighten you with this word—apolitical. Only a part of scientific directions is of a party nature—the social disciplines: philosophy, sociology, political economy. All the remaining sciences are nonpolitical. Hence it goes without saying: management through party organs is absurd. One can control process, morally train a scientist, but you cannot control his brains. He himself sometimes cannot control them. Once in a while an idea comes, forgive me, in the toilet rather than at the institute as it is supposed to. And you cannot condemn a scientist for that.

It is necessary to free the mind, to create suitable conditions for a scientific worker. Nobody today is interested in what would seem to be a microidea at first glance. And yet the "odd" infatuations with *Drosophila* flies and bats gave rise to genetics and radar.

Science cannot tolerate shouts nor stand commands.

I remember a wonderful story. A director fired a scientific worker for absence without leave. The court restored him because he proved that he got a fruitful idea in a restaurant where he was sitting at the time and that at that moment he was working—thinking.

The million and a half scientific workers that we supposedly have is a fiction. It was created by bureaucratic administrators. We have tens of thousands of candidates and doctors of sciences and significantly fewer scientists.

I. KOCHUBIYEVSKIY: The form in which the kraykom's department of science exists is without a doubt not required. Ideological work with scientists is another matter. Thus let it be that way—give unto Caesar what is Caesar's and unto ideologues what belongs to ideologues. And there is no need to interfere. Give them the possibility of working without having to look back. For example, I am now inventing something—I cannot as yet guarantee it one hundred percent. We meet secretly and discuss what to do. Almost like an underground.

S. OLENIN: What restricts you?

I. KOCHUBIYEVSKIY: Oh, the administrators are planning the result! Let us suppose I have an idea. I go to the city party gorkom. The people sitting in the department of science are sort of good guys. I tell them about my proposal. They say to me: "You have a good proposal but we cannot accept it."—"Why?"—"Because the first secretary does not like it. And we are just like the first secretary." What should I do? Submit an application and include it in the next 5-year plan (and only the first year of the present one has just ended). The clerk will look into his calendar and say: it is not in the plan. And so I rack my brains how to find the requisite line. The funniest thing of all is that later on I will get this plan from above and be forced to fulfill it. They will point out how much money was released for it, what the complement of personnel is and what equipment I can order. The equipment will arrive after several years, but I even today, let us say, need rare-earth magnets. Today! I shall steal them, word of honor!

S. OLENIN: This is not regulated for you by party organs.

I. KOCHUBIYEVSKIY: What do you mean? Everything began with the gorkom....

V. GLUSHCHENKO: I am very much disturbed by the call in the Theses for a breakthrough "in all directions." This is a recurrent high-flown phrase. We again are designating not at all that which must actually be done. Academician Velikov recently said these, in my opinion, noteworthy words: "In our time, no one is catching up with anyone." It is necessary to clearly understand that if some countries have advanced, moving according to an

exponential curve in the field, for example, of electronics, biotechnology and the like, then it would be desirable, of course, but practically impossible to reach their level.

We must determine for ourselves those directions where it is possible to assume a leadership position in world science.

I. BREKHMAN: We need to set those goals with which it would be possible to outdistance rather than to catch up. Very likely this might appear immodest, but I will cite an example from my own practice. Where does a scientist orientate himself so freely as in his own field of knowledge?

When I came to the Far East, conditions were lacking for me to study synthetic drugs. I had to look for natural drugs which science but recently did not regard with favor. The result, a unique natural preparation which is being exported from the USSR to more than 10 developed capitalist countries—it is an extract from *Eleutherococcus roots*. We lead in the creation of medicines for boosting nonspecific resistance of the organism.

I repeat: it is necessary to outstrip without having to catch up, it is necessary to seek new objectives, to search for what is one's own.

S. GOVORUSHKO: In my opinion, the USSR Academy of Sciences is one of the most conservative organizations. Perestroika here is especially difficult. It is funny to recall how it was started. For example, a commission was created for dealing with bureaucracy. Who headed it? The biggest bureaucrat of academic science. It did not last long: it began immediately to create its own bureaucratic organizations. Then it was decided to rename it and call it the commission for improving style and method of work. It would seem that a useful thing was born: it was sort of decided to select scientific supervisors. But this was in word only. They promised to take into account the opinion of the labor work collective, but only from the vantage of some kind of council. At our institute, the selection of the director was carried out quite "democratically." The collective proposed a candidate, the academy appointed another.

Then it was stated: it would be impossible to catch up with the leading countries in certain fields. I believe that it is not necessary to invent the bicycle. It is only necessary to rejuvenate science, to expand international contacts and to destroy the system of registering inventions and discoveries. In the West, organizations are endeavoring to introduce such. Among us, it is the other way around, they are shoved out of the way, and a person must himself introduce the results of his own research. As before, the rescue of those drowning remains the task of those who are drowning.

More. The introduction of cost accounting into the system of the USSR Academy of Sciences is sabotage. It is the same thing as the government order in the enterprise system.

V. GLUSHCHENKO: I am deeply convinced that formally the Academy of Sciences even now is one of the most democratic institutions in our state. I stress: formally. Nonetheless the talk of democratization of our academic life is quite to the point. Everybody talks of this justifiably and with concern.

I know of no prescriptions that would quickly lead our science out of stagnation, but I can firmly state that if we do not want to find ourselves at the very bottom, it will be necessary to immediately abrogate the decree on creation of certification commissions. It is nonsense! The role of scientific councils and councils of scientists is directly disparaged.

In thinking over as to why science is so severely ill, I come to the conclusion that the Academy of Sciences as any other state institute is to a large extent the victim of existing economic relationships.

Then is it necessary to reorganize it? One must remember that any perestroika is the syndrome of ultimate interruption. It is impossible to reach a qualitatively new level with endless interruptions. Under conditions of a total shortage of goods and services, production can in general freely live without thinking of the morrow. With customers who are ready to spend entire days at a time in lines in order to buy at least something, can one hope that production people will allow any scientific ideas to be tested in practice? They will not allow it! I am deeply convinced that the future fate of our academy will be most closely tied to whether we carry out economic reform in the USSR to its conclusion or we do not. We shall either be consistent to the end or not.

V. VASKOVSKIY: I recently arrived at the institute early in the morning and ran into a seething watchwoman. "Do you know what is going on in your place? Yesterday a young man with long disheveled hair and a beard left almost at midnight. I am going to complain to the director!" I recalled that when my friend was in the United States on probational training, the first thing that he received from his American colleagues was two keys: one for the laboratory and the other for the library.

Science must guide. Guide strictly and intelligently. But not people's behavior, rather material resources and work conditions. Then there will be results. I am an optimist. I believe that we have all the resources for coming out of the crisis. We finally have stopped blowing fanfares, vaunting our "outstanding successes" and branding "isolated defects" with opprobrious terms.

A. CHIGIRINSKIY: Today a breakthrough is again demanded of scientists. In other words a miracle. But miracles do not occur. All this smells of the thirties: at

that time a miracle was also needed, and Lysenko appeared. He immediately promised ramified wheat, chocolate milk and other nonsense. Today again there is the risk that new Lysenkos will appear on the new "miracle" wave and will promise whatever you might wish. But will they keep their promises?

It is necessary to radically change the actual approach to science and to clearly designate that this is a gradual process. It is not necessary to call on miracle workers but to raise the prestige of performers. Otherwise one is bound to hear only ironic and even insulting designations: "The people of science are white-collar workers. Scientists are parasites."

I will cite an example that will demonstrate most clearly the attitude toward science. Several years ago, fishermen were unable to catch a sufficient quantity of humpbacked salmon. A tremendous plan was launched, but the humpbacked salmon stubbornly would not come. The minister of the fish industry and the chief of Dalryba [Far Eastern Administration of the Fish Industry] once sat at opposite ends of the telephone line. The following conversation took place. Minister: "Well, how are things there?" Chief of Dalryba: "We are waiting." Minister: "What do the scientists say?" Chief of Dalryba: "The scientists are putting their heads on the executioner's block and promising the fish will come." Minister: "Why should I want their heads? I need fish!"

Yu. KASHUK: It would be clear to a fool that the present management of science is in no way different from the management, for example, of meat pie production. The country faces a dilemma: either we continue to develop the geared-lever [ruchagovo-zubchatyy] method of management or begin to improve the ideas of socialism. We need to create a socialist self-organizing society rather than a mechanism. If it should not be created, there would be nothing at all. The problem of any perestroika is first of all perestroika of people's thinking. We do not even have a mastery of contemporary religious thinking but for the most part a kind of Old-Testament thinking where even a "hair from one's head will not fall" without God's assent. All the time we are looking for a substitute for God in our earthly affairs or we invent him. For the most diverse variants, the state, or the party, or science must give its assent. So long as we do not turn to the thought that management is self-organization, nothing will come out. We will be building all the time a robotlike thing which has nothing in common with a living organism.

I. BREKHMEN: Feedback is essential. Not commands from above and thoughtless execution at the bottom. But collective discussion of problems and a collective adoption of a decision. Here there should come into play the role of both the party and the trade-union organization. While the trade union in some way (on the idea of authorization) tries to protect the rights and interests of personnel, the party organization is an absolutely silent plaything found in the left rear pocket of the director.

Well, how can you question the director as to who should be made the secretary of the party bureau? If the director has love of power, he can always give the order: "Remove this secretary from the party bureau, appoint a new one," which is what is done unquestioningly at many scientific-research institutes.

Perestroika is being directed by all the people. Through whom, through what? Through the party. Only now genuine embodiment is beginning of the saying: "The people and the party are one." We have to achieve categorical fulfillment of this saying. The party conference should direct attention to this.

I have spent 40 years in the Far East. I do not recall the kind of occasion where managers called together ordinary scientists and had a talk with them. For the CPSU kraybom and for the top administration of the Far-Eastern Department of the USSR Academy of Sciences, we simply do not exist. There are only directors. Everything is decided in secret. Each person has about 20 responsibilities—God forbid that a little bit of power is released from one's hands—and they manage to do nothing. The result is clear. The state of science in the Far East is in a deplorable state. And not just here.

A. CHIGIRINSKIY: We have, for example, the Dalplan [Far Eastern Plan] but it does not include a single person who is in charge of scientific research. We are engaged in studying timber, how to cut it down more quickly. We are engaged in studying fish, how to catch it more quickly. And no one is engaged in studying science. No one is thinking of consequences.

I. BREKHMEN: In the theses for the party conference, mention was made of social examination of plans and specifications. It is important for this to become a reality. We do not need "discussion groups" in party obkoms, we need to conduct an expert examination among understanding people. Up to the present time, decisions have been made behind closed doors. Should it want to, it creates a new institute. Should it wish to, it opens a new plant. And they do not consult with anyone. We need decisions to be made on the basis of a most thorough scientific and public examination. Scientific objectives do not always coincide with social ones. I am not now speaking about economic objectives. What is the worth, for example, of a pulp and paper combine on the shore of Lake Baykal and the plan for diversion of northern rivers?

Einstein, when he was at the height of his fame, was asked if he was sorry about his chosen profession. He said that he was sorry. Had it been possible to start all over again, he would have become a plumber because a worker is the only individual who retains at least the semblance of independence.

A scientist is incredibly dependent. He is like a mother with many children. He can be pinched in any spot: he refused to have a book printed, have financing cut, have personnel or rates reduced, and so forth and so on. At the same time, he is absolutely defenseless.

I. KOCHUBIYEVSKIY: The country has excellent experience. The general designer is more important than the director. The chief producer of a theater is more important than the director. The director may manage the affairs of an institute, but he has to yield to the scientific supervisor. Then brains would be whole and scientists

would be well fed. And not the other way around. All the glory belongs to Korolev, Mikoyan, Tupolev. And not to the economic manager of the design bureau. Let us recall Marshak's words:

The unlimited power of nature Is not burdensome to us
Because of the feeling of living freedom It has given to
the living.

Let us give to the living the feeling of freedom!

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Biographical Sketch of Latvian

Academician R. Ya. Karklin

18140252a Riga IZVESTIYA AKADEMII NAUK

LATVIYSKOY SSR in Russian

No 2, Feb 88 pp 124-125

[Unsigned article: "Academician of the Latvian SSR Roman Yanovich Karklin Is 60 Years Old"]

[Text] On 22 February the noted scientist Professor Roman Yanovich Karklin, doctor of chemical sciences, academician of the Latvian SSR Academy of Sciences and Latvian SSR Honored Worker in Industry, will be 60 years old.

R.Ya. Karklin was born into a peasant's family in the Rayskumskiy Selsovet of Tsesisskiy Rayon. In Tsesisskaya Secondary School, R.Ya. Karklin already displayed a serious interest in chemistry, which determined his future path in life. In 1947, R.Ya. Karklin entered the Chemistry Department of Latvian State University. But even prior to graduating from Latvian State University, he joined the Riga Citric Acid Plant (founded in 1948).

At the plant, he wrote a diploma project which became a serious scientific study. The first independent steps of the young student experimenter received a broad response. In 1952, R.Ya. Karklin was awarded the USSR State Prize for taking part in the development and introduction into production of a technology of microbiological production of citric acid from molasses.

On graduating from Latvian State University, R.Ya. Karklin received a proposal in 1952 to become the chief engineer of the Riga Citric Acid Plant.

One of the young chief engineer's first measures for radical improvement of microbiological production of organic acids was the development of methods of selecting highly productive strains of microorganisms.

The research conducted by R.Ya. Karklin at this time was aimed at increasing the economical aspect of biosynthesis of citric acid and improving the process of extracting the crystalline product. In 1960, he defended his candidate's dissertation "Uluchshennyy tekhnologicheskii rezhim proizvodstva limonnoy kisloty iz melassy" [An Improved Technological Method of Producing Citric Acid from Molasses].

A series of works was conducted under R.Ya. Karklin's supervision studying the action of mineral substances on the process of formation of biomass for the producing agent [producent] and its biochemical activity and ways of forming byproduct acids depending on the conditions of cultivation of the producing agent and other aspects of biosynthesis of organic acids. The results of this research were generalized in a monograph "Biosintez organicheskikh kislot" [Biosynthesis of Organic Acids] (1972).

In 1960, R.Ya. Karklin organized a problem laboratory for itaconic acid and in 1961, it produced its first samples. In 1963, an itaconic-acid shop began to operate at the plant. Production of itaconic acid was started at the Olaynskiy Plant of Chemical Agents (now the Biolar Scientific-Production Association) and then at the Cherkassy Plant of Chemical Agents.

Under R.Ya. Karklin supervision, the selection of producing agents of itaconic acid was carried out and production conditions were developed for the fermentation and technology of formation of crystalline itaconic acid. For his participation in the development and introduction of a production technology for itaconic acid, R.Ya. Karklin was awarded the Latvian SSR State prize in 1965. In 1966, he was conferred the title of Latvian SSR Honored Worker in Industry.

Taking into consideration the high level of scientific research and experimental work, the plant was included in the system of the Latvian SSR Academy of Sciences as a production base of the Institute of Microbiology imeni Avgust Kirkhenshteyn.

At this time, several scientific-research laboratories of the Institute of Microbiology were organized at the plant's location under the methodological supervision of R.Ya. Karklin: a biotechnological, a chemical-engineering and an enzyme laboratory. The field of research work was expanded: in addition to mold fungi, biosynthesis of yeast is being developed with the aid of bacteria; depth [glubinnaya] fermentation and its special features are being studied; basically new equipment is being developed for the fermentation of deep-lying cultures; new methods are being introduced of producing chemically pure substances (ion-exchange technology, ultrafiltration, ultracentrifuging, electrodialysis and others).

R.Ya. Karklin takes part in the work of the Institute of Microbiology in the development of fodder lysine, nitrogen [sic!—nitrogen (?)] and plant-growth stimulators.

Concurrently with this, he was engaged in the production of pure and especially pure biologically active substances by means of microbiological synthesis. Theoretical and experimental research was conducted on processes of ion exchange in chemical processing of fermentative solutions. As a result, methods were developed of producing pure amino acids.

In 1971, R.Ya. Karklin was awarded the title of doctor of chemical sciences.

At this time R.Ya. Karklin's cooperation begins with scientists of the Institute of Biochemistry and Physiology of Microorganisms of the USSR Academy of Sciences. An interesting and little studied aspect in biotechnology is at the center of their research efforts—control of the process of biosynthesis with the help of limiting one of the nutritive medium's components. As a result of jointly conducted integrated research, the possibilities

were discovered of utilizing hydrocarbons from petroleum for the biosynthesis of organic acids—citric, isocitric, alphetoglutamic and pyruvic produced by yeast.

The development of industrial production of enzyme preparations with the aid of microbic synthesis is of theoretical and practical value. A technology was worked out of producing glucoamylase, glucoxydase, catalase, cellulase and other enzymes. The series of works on biosynthesis and extraction of pure amino acids—lysine, glutamic acid, tryptophane—is important.

Already in the '60s, R. Ya. Karklin turned his attention to the development of waste-free microbiological production operations. Under his supervision, a technology was developed and utilized of producing premixes, vitamin and mineral stimulants and feed additives for animal husbandry on the basis of byproducts of citric-acid production.

The results of the conducted scientific research and its practical application in biotechnology were generalized in the monograph "Biotekhnologiya mikrobnogo sinteza" [Biotechnology of Microbic Synthesis] (Riga, 1980) written by R. Ya. Karklin as a coauthor.

For his participation in the development and introduction into production of lysine premixes, R. Ya. Karklin was awarded a second Latvian SSR State Prize in 1980.

Under R. Ya. Karklin's supervision in cooperation with the Institute of Wood Chemistry a number of preparations were synthesized for medicine, such as celnovokain [tselnovokain] and celucarpine [tselukarpin], and with scientists of the Institute of Inorganic Chemistry preparations were produced for anticorrosion protection on the basis of products of microbic synthesis—borogluconate and a rust modifier.

The results of R. Ya. Karklin's theoretical and practical work in the field of development of microbiological production were reflected in the significantly increased output of citric acid and a number of other organic acids for the country as a whole. Selected producing agents of citric and itaconic acids and developed technologies were introduced at all of the plants in the country producing these acids.

The high indicators of the technological process of producing citric acid have also caught the interest of foreign firms. Enterprises and firms of France, Turkey, Yugoslavia, Czechoslovakia and Bulgaria have become partners on a licensed basis.

R. Ya. Karklin pays a great deal of attention to scientific organizational activity. He is chairman of the Latvian Branch of the All-Union Chemical Society imeni D.I. Mendeleev, a member of the Board of the All-Union Scientific and Technical Society and an honorary member of the All-Union Microbiological Society.

R. Ya. Karklin is an instructor at the Intersectoral Institute for Upgrading the Qualifications of Specialists of the Economy of Latvian SSR. In 1970 he was conferred the title of professor. R. Ya. Karklin has published 5 textbooks for microbiological and biochemical specialists. He is the author of 225 publications and has more than 70 author's certificates and patents. Seven candidate's dissertations were prepared under his guidance.

Since 1982, Academician R. Ya. Karklin has been the director of the Experimental Plant of Biochemical Preparations of the Institute of Microbiology imeni Avgust Kirshenshteyn of the Latvian SSR Academy of Sciences. He devotes his chief attention to the development of promising directions of scientific-research and experimental work at the plant and the quickest possible introduction of scientific developments into the economy.

In party work, R. Ya. Karklin fulfills the duties of deputy secretary of the party committee of the Latvian SSR Academy of Sciences and chairman of the head group of the academy's people's control.

R. Ya. Karklin has been awarded the orders of the Labor Red Banner and the October Revolution and medals.

R. Ya. Karklin marks his 60 years full of creative ideas. We wish Roman Yanovich energy and new successes in his fruitful work.

7697

Obituary of Ukrainian Geologist Oleg Stepanovich Vyalov

Kiev RADYANSKA UKRAYINA in Ukrainian
4 Jun 88 p 4

[Obituary "Oleg Stepanovich Vyalov" signed by Presidium of AN USSR [the UkSSR Academy of Sciences]; the Earth Sciences Department, AN USSR; Council of Western Scientific Center, AN USSR; and the Geology and Geochemistry of Combustible Materials Institute, AN USSR]

[Text] On June 1, 1985, a well-known Soviet scientist, a geologist, UkSSR Honored Scientist, Doctor of Geological Mineralogical Sciences, Professor, an management's adviser at the Geology and Geochemistry of Combustible Materials Institute, AN USSR, Oleg Stepanovich Vyalov died at the age of 84.

O.S. Vya... was born on January 23, 1904 in the city of Tashkent. His working life began right there in 1917, at a medical research laboratory. After graduating from Leningrad State university in 1928 he worked at the Geological Committee (currently the All-Union Geology Institute), and beginning in 1933 he worked at the All-Union Scientific Research Geological Prospecting Institute (VNIGRI). In the 1930's he was also teaching at Leningrad university and Leningrad Mining Institute.

Since 1945, O.S. Vyalov's life and activities had been linked to the Western oblasts of the Ukraine. While working as Chief Geologist of the VNIGRI Western Ukrainian expedition in the city of Lvov, he organized the first integrated geological studies of the Carpathians. From 1949 to 1987 O.S. Vyalov worked as a Department Head at the Geology and Geochemistry of Combustible Materials Institute, AN USSR.

He authored over 500 scientific works on tectonics, regional geology, stratigraphy, paleontology, hydrogeology and geology of oil deposits. Central Asia and the Carpathians were the main regions he studied. In 1955-1956 he took part in the first Soviet Antarctic expedition.

O.S. Vyalov had successfully combined scientific and pedagogical work. In 1945-1960 he headed a chair at the Geology Department at Lvov State university imeni I.Ya. Franko.

O.S. Vyalov had conducted considerable science organization work. He was the founder and President of the

Ukrainian Paleontological Society, a member of the Soviet National Committee of the Carpatian-Balkan Geological Association, USSR Intersectoral Stratigraphic and Tectonic Committees and the Ukrainian and Central Asian Intersectoral Stratigraphic Committees, an honorary member of the All-Union paleontological Society, and a member of Geological Societies in Hungary, Poland, Serbia, France, Austria etc.

O.S. Vyalov's services were rewarded with the Order of Lenin, Order of Friendship of the Peoples, Order of the Badge of Honor and a number of medals. He was a USSR and UkSSR State Prize winner, a V.I. Vernadskiy Prize winner. He was also awarded a Czechoslovak Academy of Sciences Gold Medal.

The bright image of Oleg Stepanovich Vyalov will live forever in the hearts of those who used to know and work with him.

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